Telephony.

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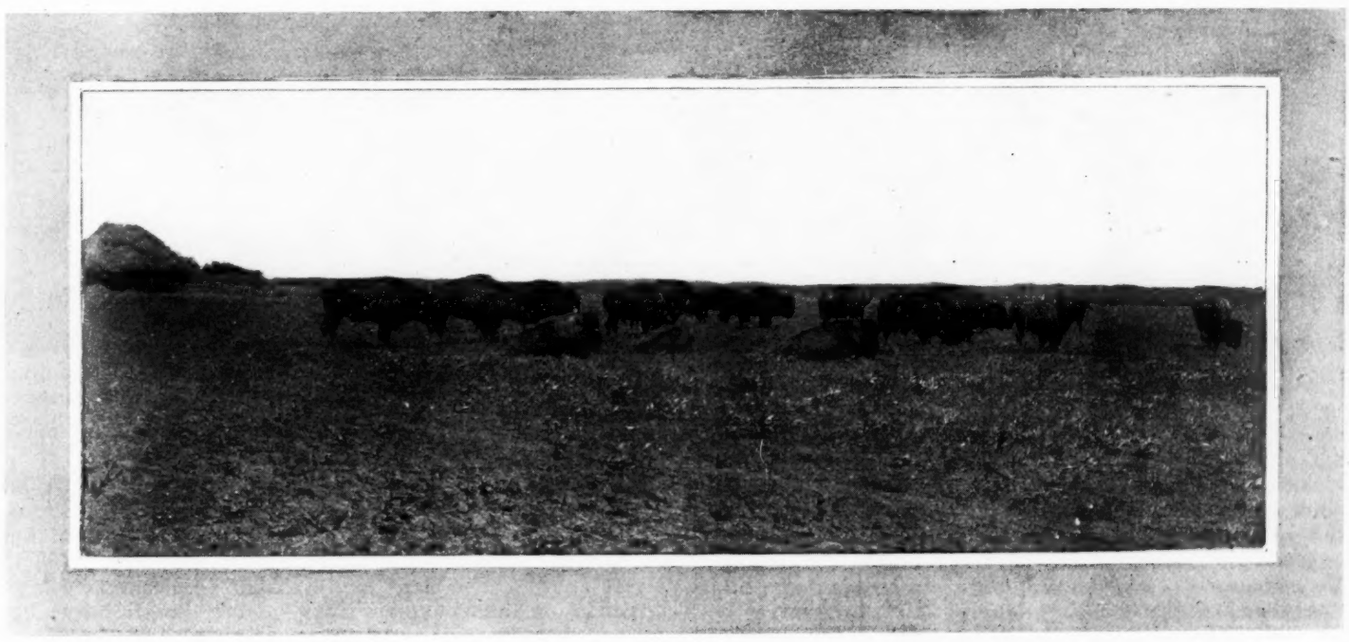
A Buffalo Chase By Telephone

MARION FOSTER WASHBURNE

WHEN we struck Oklahoma, we found, even before we got off the train, that that entire territory, together with the Indian Territory, was bent on some kind of a monstrous celebration at the 101 Ranch. It was not exactly clear what they were celebrating unless it was their own phenomenal growth and energy. The affair was to take place on Sunday, and, together with everyone else except the unfortunate preachers who were tied to their pulpits, we took one of the twenty-six overloaded excursion trains and made for the temporary station at Bliss.



BUFFALO GRAZING ON THE PLAINS.

We were received with open arms, in fact everyone was —black, white and red; southerner, northerner, easterner and westerner; German, Italian, clear American, and nondescript—all met here on the vast rolling plains bent upon having the best of good times. We were escorted to seats high above the heads of the great concourse of people by a gentleman clad in what we ignorantly imagined to be sheepskin breeches. Later on we discovered that these hairy nether garments were goatskin shaps, and we added a new word to our vocabulary and a new item to our stock of general information; for shaps, you must know, are a species of leggings of goat's hide with the long, white hair on the outside. Their use is to protect the legs of the cowboys while riding. Without them they would not be able to endure the long, cold journeys across the country in winter. On this day, however, they looked decidedly warm, for the thermometer stood somewhere above ninety.

Installed in our places of honor we looked forth over an immense multitude of people. Between forty and fifty thousand must have been gathered there upon the plains, which only a few years ago knew nothing but Indians and buffalo. The arena was a mile and a quarter long and half a mile wide, and the grandstand, groaning with people, completely encircled it. Back of the arena were the pens which held a large herd of long-horned Texas steers, and another herd of thirty-five buffalo. The latter were directly under the press-stand upon which we had our places. The impatient animals bellowed and stamped, made uncomfortable by the flies, by the puffing of the automobiles carrying the

Ponca chiefs around the circle, and by the barbarously mingled strains of the sixteen bands.

After the procession, which was two miles long, and which included every conceivable kind of farm machinery and all sorts of carriers, from the stage coach of the early days, still in serviceable condition, through mule wagons, ox-carts, mustangs, and fine saddle horses, to the automobile, came the characteristic features of the entertainment. These included the breaking of outlaw horses, the riding of bucking broncos, and a buffalo chase. It was all interesting—wonderfully so to a lady tenderfoot from the east—but for the purposes of this story we shall confine ourselves to what happened to the buffalo.

In the first place, people insisted in going into the only passageway which led from their pen to the arena. Here, the spectators evidently thought, was one clear space whence a full view could be obtained. Over and over again the Miller Brothers, owners of the ranch, mounted on good horses, with silver-trimmed saddles, ordered the intruders back; but again and again new sections of the crowd filled up the passage. Finally the militia was called upon, and slender boys in khaki swept the intruders out of the way with long muskets. Back of the inner gate leading to the passage the frightened buffalo pressed, a huge, hairy mass that looked menacing enough in all conscience to keep any crowd away. Nevertheless a popcorn boy anxious for trade climbed over in front of them and only when the horrified yell of the crowd went up did he seem to fully appreciate his danger. "Hey, boy! Look out for your pop-corn!" they called. "You'll lose it, sure!" He was yet perched upon the top rail of one of the guarding fences when the animals tumultuously burst through the first gate into the narrow passage.

The outer gate leading directly into the arena should here have been opened, but for some reason it stuck fast, and the plunging herd, with eyes bloodshot and wildly rolling, climbed upon each other's backs, and, finally, in heaps three stories high, threatened to topple over the swaying railing full upon the huddled throng. Everyone held his breath. There was no sound but the loud panting and scrambling of the animals, the bellowing of the sympathetic steers, and the creaking of the strained barriers. The hot air smelled of fur and of cattle. It is hard to say what might have happened had not Zach Miller at that moment got the gate loose. Ejected violently into the arena, the released buffalo lowered their bushy heads and tore away like mad.

The chase that followed was sufficiently exciting. It was not theatrical; it was real. We, who had been so close above the struggling animals, who had felt the supports of our stand shake with every struggle, did not demand that such a chase should be conducted in a perfectly orderly, effective fashion, as it would have been at Buffalo Bill's show. We were content with the galloping horses, the shrill cries of the riders, the red dust that hung in the air. It was no more than we expected when the terrified animals, finding here and there a thinner line of people than usual, broke loose and went scurrying away into the blue distance.

Only four of them succeeded in making a final escape.

INDIANS PREPARING TO BARBECUE A BUFFALO AT 101 RANCH.

In the above picture Chief Geronimo is doing the killing, and one old bull was killed and roasted for the benefit of the visiting editorial association. The commandant of the neighboring Indian reservation is said to have telegraphed when he heard of the proposed feast of buffalo steak, "God pity the editors."

The others were successfully rounded up by cowboys and Indians, all working together in the sultry heat. But not even these four could be left at large. They might hurt people, and besides they were worth $700 apiece. They were going like so many express trains—considerably faster than an Oklahoma express train—and the question was, how to get them stopped and returned to civilization before they became entirely exhausted by their violent exertions in the heat.

Certainly this would have been impossible twenty or thirty years ago. Then, to be sure, buffalo hides sold at a dollar apiece and no one would have cared had a few of the animals been lost. But even had anyone cared there would have been small chance of making good the loss. Such are the compensations of modern science; we have more wants to satisfy, to be sure, but then we have more means through which they may be satisfied.

That day we heard no more of the lost buffalo. Everyone was too intent upon the show, and the after talk was all about the fourteen persons who had been injured in the

collapsing of a portion of the grand stand. This catastrophe did not at the moment make any perceptible impression upon the crowd. Eager to see, they climbed back upon the shaky supports from which the seats had just been torn, and, in spite of the various creakings and groanings of the overburdened timbers, remained there until after Lucille Mulhall had roped and tied her steer, and the Texas negro had thrown one to the ground with his teeth and held him there helpless by means of the same primitive weapons. As subjects of talk, however, after everything more exciting had been disposed of, the little baby that had been killed, its mother who was dying, and the round dozen of other persons with broken backs and legs, served to fill up the remaining hours of home-going.

It was a day later when we heard again of the fleeing buffalo. We were stopping at 101 Ranch, the guests of the weary but hospitable hostess who had just dismissed thirty other visitors. Prepared as we had been to find many of the advantages of modern living in Oklahoma, we could not help being surprised at this comfortable home, furnished in old mahogany, with hardwood floors, steam heat, and plenty of running water. It had, of course, a telephone in the office—a large room opening directly off from the parlor where we sat. The bell rang almost constantly, and our hostess, every few moments, would rise from telling us about her hundred dollars' worth of cream, and her two thousand little turkeys, to answer the ringing of the busy instrument.

"How do you keep it in repair?" I asked. "Don't the great storms here often injure the lines?"

"Oh," she answered, "we can't manage without it, even for two hours. So we keep a man whose business it is to look to the batteries and the wires. He keeps not only our own lines in order, but also those of our immediate neighbors, and is as profitable an employe as any we have on the place."

"How many employes have you?" I asked.

"Oh, about two hundred and twenty-five, I think, just now," she answered carelessly, "and about fifty miles of telephone wire. You see we can't manage at all without the telephone. By means of it we order all our supplies, communicate with the stock-yards in Chicago, and, when necessary, sitting right here in our ranch office, fifty-six miles from Guthrie, talk directly to New York."

I understood then the urban look of the house. These people might seem to be cut off from the rest of the world, but that was in appearance merely. The insistent little instrument in the corner was the tie that bound them close to all the living, acting world.

"I am hoping for news of the buffalo," said Mrs. Miller and—the telephone rang again.

"Hello!" she called, "Hello! Yes, this is Mrs. Miller. In the middle of your wheat field? Oh, that's too bad. Where are you? I say, where are you talking? My goodness! He has run nearly a hundred miles. Well, just hold him there until we send after him. You can't? Why can't you? How big is your field? Is it fenced in? Well, you dismiss your men for to-day, close your gates, and we will pay the bill. Yes; well, I said, we'll pay the bill. We'll pay for all the wheat he eats. We'll pay all damages. Just keep him there. Don't start him up or drive him, it is too hot now. Don't worry about your money, we'll send it along. You just hold onto the buffalo."

She rang off and came back to us fanning herself violently.

"That man must think buffalo are cheap," she remarked. "As if a day's work of a dozen men amounted to anything. Why we have the only good-sized herd of buffalo in the territory, and we can't afford to lose *any*!"

Just then her son came into the room and she reported what the man had said. He went quickly to the telephone, called up Ponca City, and ordered six men and a four-mule covered wagon to go to Old Tim Leininger's ranch and get the buffalo.

THE 101 RANCH, WHERE BUFFALO HUNT TOOK PLACE.

This ranch has fifty miles of telephone wire. It is the place young Croker was bound for when he met his death. He had expected to be married here.

"If he is too hot," he called, "wait until night. Don't load him while he shows fight."

He sat down with us, fanning himself with his broad-brimmed hat. "One of the animals," he explained, "got clear out west. We traced him right along by means of telephone reports until he reached a little country schoolhouse. Now, they have a narrow-minded school committee in that district and the school is not equipped with a telephone; the consequence was that the teacher and the children were frightened half to death at the great shaggy animal pawing around just outside the door. They locked themselves in, and had to stay there until the anxious parents put in an appearance about dusk trying to find out what the matter was. They found out and I guess half a dozen of them telephoned at once to us to come and get our property."

"Have you got the other two?" Mrs. Miller asked him.

"Oh, yes, they are on the way here now," the son answered carelessly. "We will have quite a bill to pay for one of them. When she was being loaded on the train—she was about ninety miles south of us here—she went right through the freight car and came out on the other side. I don't believe she knew it was there. That was the one with the

calf, and there was plenty of room for the calf to follow her through."

"What I can't understand," said I—tenderfoot that I was—"is why, if these buffalo are worth the large sum of money you are paying out for damages, you should be willing to kill so many of them at your entertainment."

Joe Miller turned to me with a twinkle in his eye. "How many do you suppose we were willing to kill?" he demanded. "How many did you see killed?"

"Not any," I answered, honestly, "but I supposed that was some sort of mistake. I understood you telephoned Mr. Dan Beard of the Humane Society in New York that you wouldn't kill more than thirty-five."

"That's right," said he, "we wouldn't, because we couldn't. We have only thirty-five."

"Well, but—"

"You see, it was this way," he explained, frankly. "We wanted the militia. The adjutant-general refused them to us because our show was going to take place on Sunday. We knew we would just naturally have to scare up some way to get them, because they added to the view and could serve as police. So we sent out word, sort of promiscuous, that we were going to have a buffalo hunt and kill some of them in the old Indian style. Dan Beard got hold of the story—well, I guess we talked a little to our friends in New York—and called us up by telephone to remonstrate. We told him we should hunt the whole herd with bows and arrows, but that we'd agree not to kill more than thirty-five. That was sure true. Well, he telephoned Roosevelt about it, and sent out a pile of remonstrances, and Roosevelt telephoned the governor, and the governor ordered the militia."

This certainly scored one for the Millers. For they had originally offered to treat the militia as their guests, to pay their expenses, and keep them comfortable while they were on the ground; but by this canny arrangement they got their militia for nothing. The territory paid the bill, amounting to some $500, and this easily paid the damages inflicted by the runaway buffalo, and left something over to the credit of the noisy instrument in the corner. It had proved its power by hunting four wild buffalo and inducing the President of the United States to add style to a big western party.

BEST METHODS OF ADVERTISING.*

The committee to which was referred the matter of "Best Methods of Advertising," was not certain just what ground it was intended should be covered. The subject is so broad that one is easily lost in a labyrinth of speculation.

The committee was unanimous in the opinion that a system of publishing throughout the country in both the press and by pamphlets, facts judiciously setting forth the progress and stability of the Independent telephone business, could be handled so as to be of incalculable benefit, and place the business in a position to command the attention and support it deserves and needs.

No other enterprise undertaken in this country, approaching in magnitude the telephone industry, can point to the phenomenal growth and unvarying success that has characterized the telephone business. The percentage of defalcations will compare favorably with other leading branches, including banking, mercantile and railroad enterprises, and failures have been practically unheard of. Hence, we insist that proper presentation of the business, persistently kept before the public, immeasurably increases the business and convinces the financial world that no industry is more stable and secure.

We are informed by a member of this convention that only recently the opposition published a report at a critical point in Nebraska, that a certain plant of some prominence in Texas had defaulted and gone to the bad, the inference being that the Independent movement was unstable and would in time result disastrously to those interested. The reputed bankrupt plan appears to be one of the best and most prosperous in the country, and was marching happily onward and upward while its friends in Nebraska were mourning its reported misfortunes, and its traducers were laughing over the black eye they had given the Independent movement in the locality where the report was circulated.

An efficient central authority, to whom all such reports should be sent instantly, could have promptly refuted this story, not simply in the locality where first published, but could have exposed the trick throughout the country in such a light as to have brought just contempt and odium upon its perpetrators.

In local advertising it is felt that much may be accomplished by a central bureau devoted to the business, in the way of furnishing copy and suggestions calculated to bring the system of the Independents before the public.

The committee is agreed that it is bad policy to advertise the opposition, except when it may be necessary to be personal, to correct misrepresentation or to institute comparisons, and then only in a dignified and courteous manner. By persistent, direct statement, in words and illustrations, in the press and by cards, blotters, etc., keep before the public the advantages offered by the Independent exchanges and toll lines—the systems which have forced the reduction in prices of nearly one-half for both exchange and toll service.

To more effectively carry forward this work your committee recommends that:

The red, white and blue shield bearing the words, "Independent Local and Long-Distance Telephone," with the stars, as shown in the sign now in use, be adopted as an emblem to be used by all the Independent telephone people throughout the United States.

That an advertising or publicity bureau be established by this association under the direction of the executive council, which shall employ a competent man, who shall compile, prepare and publish such facts and comments as will tend to place the Independent telephone business in its proper light before the public and aid local operators as far as possible in advertising their business to the end that uniformity and general good may result.

Committee—J. A. Hudson, chairman, Columbus, Mo.; W. H. S. Houck, Erie, Pa.; G. T. Everett, secretary, Columbus, Neb.; H. A. Douglas, Cedar Rapids, Iowa; Vinton A. Sears, Boston, Mass.; E. W. Dunaway, Dallas, Texas; M. B. Overly, Cleveland, Ohio; W. J. Melchers, Alma, Michigan.

*Report of Committee read at National-Interstate Telephone Convention, at Chicago.

PLAN PRETENTIOUS LONG-DISTANCE SYSTEM.

Within the next few months the Home Telephone Company of Joplin, Missouri, expects to extend its lines to make Joplin the center of a large long-distance system for the southwest country. The $750,000 worth of bonds which were voted some time ago will be used exclusively for these extensions and equipments. The contemplated improvements and extensions will cost about $100,000, which will include about forty carloads of new poles and 70,000 feet of cable. All ordinary metallic wires will be replaced with copper. The exchanges at Webb City, Carterville and Carthage will be enlarged and a new one installed at Purcell. A new line will be installed from Carthage to Neosho, touching Granby and Diamond City. It is expected to install at least 1,000 new telephones in Joplin within the next ninety days. The company also has in view the construction of a long-distance line to Fort Smith, Ark., and Springfield in the not far distant future.

Special Information by Telephone

SAMUEL G. McMEEN

EVERYONE who has spent much time in a small city knows what happens when the fire bell rings and the fire department goes to the scene of action. In addition to the social activity displayed by those who are free to follow, there is an immediate development of an intense curiosity on the part of all to know the exact location of the fire, and this is the more intense on the part of those who have property and other interests likely to be affected.

In every small city where the existence of a fire is made known by any sort of signals struck on a tower bell, the telephone exchange is besieged by queries as to where the fire may be. If the accident occurs during the business day, it is usual for the number of calls within a few minutes after the sounding of the alarm, to be such as are absolutely incapable of being cared for by any manual or automatic switchboard which has been invented, or at least which has been installed in the world up to this time.

In a careful count of calls in an exchange of 600 subscribers, an alarm of fire caused the setting of over 85 per

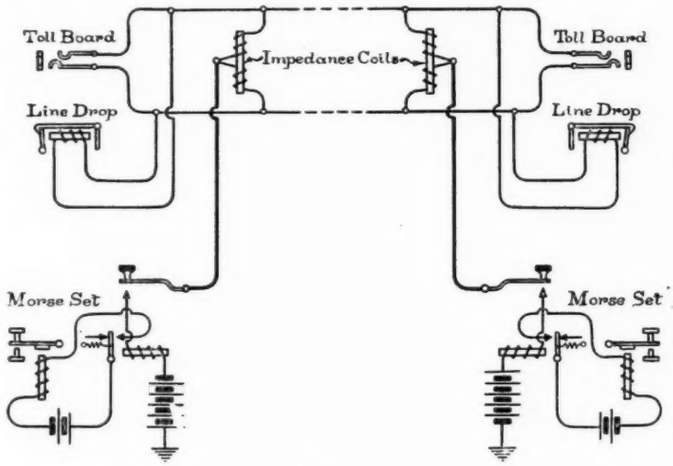


FIG. 1.

cent of all the line signals in the office, and it is to be presumed that only a very small part of these were for other than fire location. All managers of small exchanges —and by this is meant all under two or three thousand subscribers—are familiar with the congestion which occurs, and it is believed that all will agree that it is wholly impossible to give the information to all calling subscribers by the usual expedient of plugging in, answering the call, and giving the proper answer.

There is no difficulty which good management will not remove in the matter of getting the information to the operators quickly enough to enable them to distribute it. The unsurmountable thing so far has been that it is out of the question for operators to answer the calls fast enough to prevent waiting and much annoyance on the part of those who are calling.

A number of efforts have been made to meet this condition, one of which was practiced for several years, and required that the chief operator, or some other one person in the central office, should be given the location of the fire, which she would then begin to repeat into the transmitter over and over, saying "The fire is at Fifth and Main streets—The fire is at Fifth and Main streets—The fire is at Fifth and Main streets." The circuit of her telephone set was carried in multiple to all the positions of the switchboard, being in multiple to at least two plugs at each position. On the appearance of a great influx of calls immediately following the fire alarm, it was the duty of each operator to stop giving regular commercial service, and merely to plug into calling lines with the special plugs, leaving them plugged in only for a few seconds

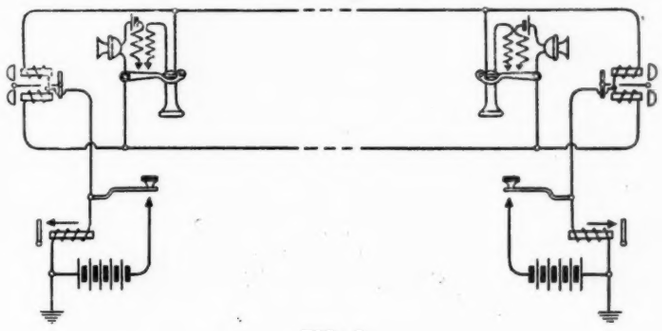


FIG. 2.

each, then transferring them to other lines. It was expected that in the short time the plug remained in the jack the calling subscriber would hear the information at least once repeated.

In this plan it will be observed that the fundamental feature was that it contemplated a total abandonment of regular exchange service during the time of the special rush for information. A casual observer, unfamiliar with the telephone business, would probably see at once that this is an almost fatal objection, because at the time of a fire the normal use of the telephone is immensely more valuable than this special use, mainly adopted to satisfy the curious. But when it is remembered that as long as the public inflicts such a mass of calls, and there is an almost total paralysis of commercial service, it will be seen

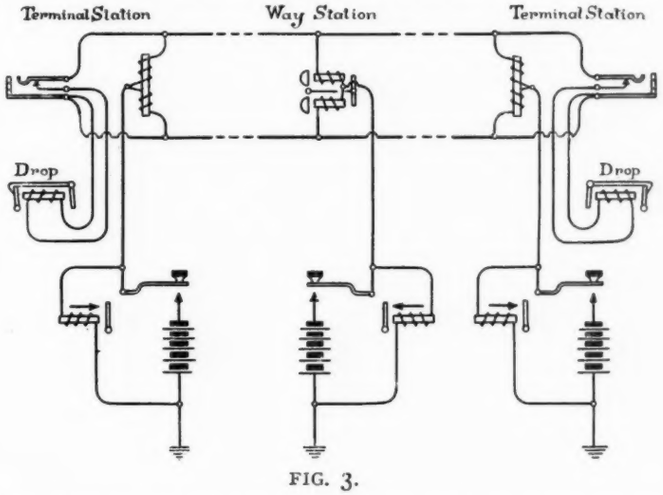


FIG. 3.

that whether or not the whole office shall be given up to disseminating fire locations, any special business such as calls from the fire chief to a branch of the department, will probably fail to be handled. One can imagine the annoyance and disgust of such an official of the fire department on calling the central office to secure more engines and hose reels, to be told in an exasperating monotone that "the

fire is at Fifth and Main streets." This would likely be all the more maddening because of the fact that he is there himself.

A few weeks ago a telephone company operating in one of the western states announced that it would probably find it necessary to refuse to give fire location information, in the hope that by such refsal it might wholly or partially discourage the practice of calling on the central office for the facts, and thus enable it at such a critical time to more nearly perform its usual and important function.

The result of this announcement was to arouse the wrath of the neighborhood, and a newspaper in a neighboring city is said to have commented that the offending company "should not forget that there is room for one more telephone system in any town." In such a condition it is easy to imagine the management wondering which horn of the dilemma is the worse.

It has long been considered possible to meet this condition by means of apparatus, and in a few instances installations of such apparatus have been successfully utilized. The first to be so applied was in connection with a board serving grounded circuits only, and was abandoned only because of the conversion of the system into one utilizing metallic circuit throughout, and into which the plan did not fit.

The original arrangement referred to was one in which the fire location information was given to the chief operator, and by her monotonously repeated into a transmitter connected as shown in Fig. 1 in series with a battery and the common office ground. A little thought will show that this battery and transmitter are in series with a path common to all the lines in the town under normal conditions, and that the only lines not sharing that path are those connected together by switchboard cords. This is exactly the condition required, because the method of operation called upon subscribers to remove the receiver from the hook and listen for the fire location without signaling the central office by turning the crank of the magneto bell.

Those who are familiar with the extreme amount of division which may take place in voice currents, and still leave them not only audible, but intelligible, will appreciate that the number of subscribers' lines which may be served in this way will be very large, even though there is some division of current even through stations at which no one is listening. The results will be better for the given number of stations, or possible at the same volume for a larger number of stations, where all are equipped with bells with high resistance ringers.

In the case of the first experiment there were 900 lines, and upon these perfectly accurate fire locations were given for many months.

An incidental proof of the effectiveness of the system lay in the experience gained in distributing election bulletins. These were given on the same transmitter as was provided for fire locations, and with such accuracy that a newspaper which had been calling at intervals for special bulletins from the rural districts, stopped doing so and kept a man at the telephone continuously taking down the routine information given by the one bulletin reader at the fire location transmitter. Many of the substations in this equipment had bells with 80 ohm ringers.

The application of this scheme to common battery systems is less convenient than to magneto systems because of the fact that a call is placed by the mere removal of the receiver from the hook, and listening is not usually possible otherwise. Several methods suggest themselves, however, one of which is illustrated in Fig. 2, in which the central office is called the same as in the original arrangement, but in which the subscriber must perform a special act to defeat setting the signal. This act is to press the key *K*, opening his transmitter circuit, and preventing a call upon the line.

It is obvious that any arrangement which will leave the receiver in series with a condenser across the line will enable the subscriber to hear without calling the central office. Any substation set containing a condenser may be so arranged without difficulty. Similarly, any central office circuit involving the use of a cut-off relay instead of a cut-off jack, may be arranged to furnish the special information through the line relay or line signal, this information being stopped by the act of answering, and real conversation between subscribers being free from the annoyance of undesired information.

The transmitter at the central office and of the circuit is that which spreads the special information, and if of a type capable of carrying a good volume of current without burning, will give surprising results.

YANKEES TELEPHONE KING EDWARD.

That King Edward never lets slip a chance of doing anything that tends to promote friendly relations between England and America was strikingly illustrated by an incident that occurred the other day, writes a London correspondent of the Philadelphia Record. Incidentally also it illustrates what American audacity can accomplish. Armed with a letter from Henry White, formerly first secretary of the American embassy in London, and now ambassador to Rome, a party of Americans traveled to Buckingham palace to "do" the royal residence and the royal "mews," as aristocratic stables are always termed here. The letter sufficed to get them shown over the stables, where they were able to feast their eyes on the king's horses and carriages, but they were told that they could not go over the palace itself without a permit from the lord chamberlain, that being an inflexible rule where foreigners are concerned. Earl Clarendon fills that office. He was out of town, and none of the palace officials knew where a message would find him. Apparently the difficulty was an insurmountable one. It would certainly have been deemed such to any but Americans.

One of the party suggested that the lord chamberlain's permit might be dispensed with by obtaining the consent of the king himself. When the palace officer had recovered from the shock this caused him he explained that that also was impossible, as the king was attending the races at Newmarket. Not one whit abashed, the spokesman of the party inquired if he could not be communicated with by telephone. When the official had again regained his breath he admitted that it was possible and that the palace contained a telephone, which could be switched on to any place where his majesty might be staying, but there was no precedent for employing it for such a purpose. Apparently another impasse had been reached. However, after a good deal of palavering the persevering American succeeded in reaching the young man in charge of the palace telephone. It took some time to bring him around, but finally he decided that he would risk it, though he declared emphatically that he would never have dreamed of doing a thing so unusual for any but Americans.

It did not take long to obtain a reply. If the Americans were properly authenticated they were "by his majesty's commands" to be allowed to go all over the whole palace without being subjected to any irritating scrutiny. That settled it. They "did" the palace most thoroughly and the attendant flunkeys could not have shown them more consideration had they been personages of royal blood. When they had finished sight-seeing they were invited to partake of luncheon in the palace by one of the big wigs attached to his majesty's household.

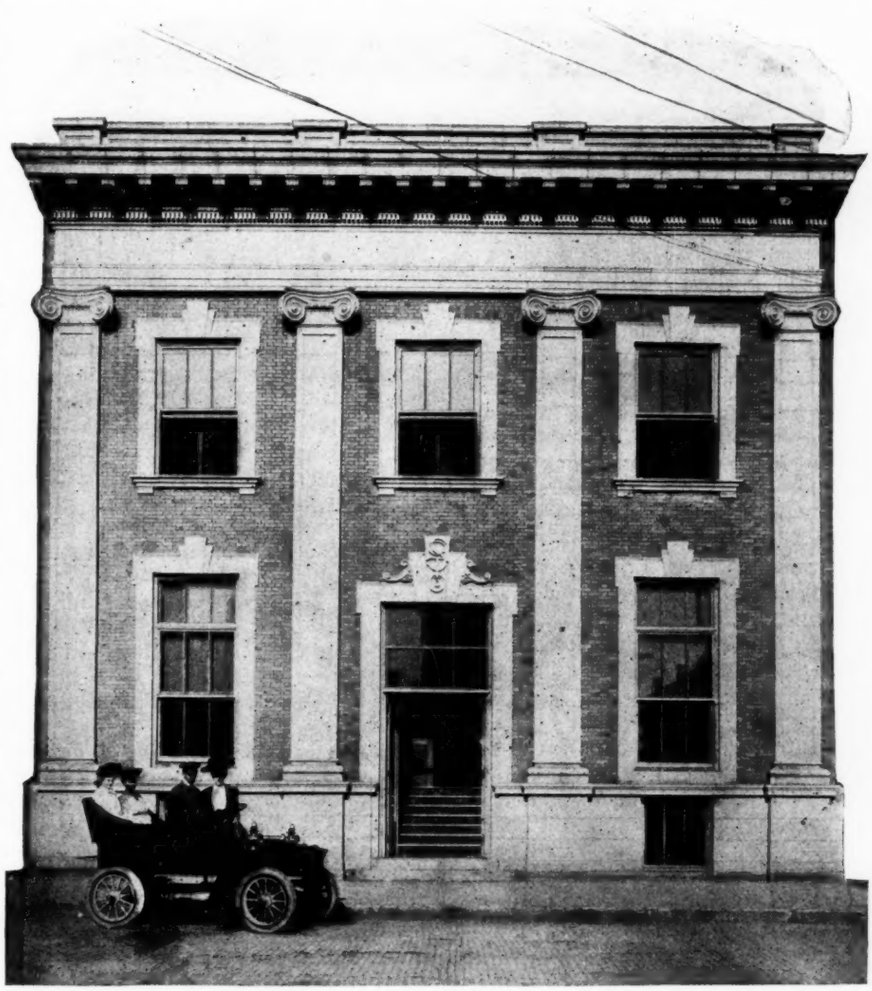
It is announced that $25,000 improvements to the Co-operative telephone line of Detroit, Michigan, will be completed in from four to six weeks.

Sioux City's New Automatic System

GEORGE T. HEWES

BY August 1 the new automatic plant of the Sioux City Telephone Company of Sioux City, Iowa, will be fully completed and giving service to at least 2,000 subscribers, which is the number stipulated in the franchise for the opening. The company starts out with every prospect of abundant success. Its directory is composed of some of the leading business men of Sioux City, including F. L. Eaton, president of the Sioux City Stock Yards Company; E. W. Rice, president of the Merchants' National Bank; W. P. Manley, president of the Security National Bank; Howard S. Baker, druggist; T. A. Thompson, president of the Iowa Securities Company; D. S. Lewis. mortgage and real estate broker; George C. Scott, attorney.

In addition to the strength represented by the board of directors, the company has about one hundred local stockholders, representing all branches of business, and making it a strong *home* company, which cannot fail to merit and secure the telephone business of the city. A year ago, when the question of granting a franchise to the new company was voted upon by the people, the result was 1,691 for to 83 against, showing conclusively that Sioux City realized the necessity of emancipation from the high rates, poor service and arbitrary treatment which has prevailed so long in that city.



EXCHANGE BUILDING OF SIOUX CITY TELEPHONE COMPANY.

Sioux City is the gateway of four states. The rich regions of Nebraska, Minnesota, South Dakota and Iowa do their full share toward furthering her prosperity, and her eight lines of railroads, diverging in all directions through northern Iowa, southern Minnesota, South Dakota, North Dakota, Wyoming and Montana, afford ample means for distribution to her customers. And her jobbing trade surpasses any city of her size in the country.

Destined to become one of the great packing centers of the Missouri Valley, Sioux City has attracted an investment of $7,500,000 by the three leading packing companies of the United States. These properties—the packing houses, stock yards and street railway system—are being enlarged and extended to keep progress with the city and tributary territory. The fertility of the soil and the enormous production of corn and grasses make this territory the paradise of the stock raiser and feeder. Sioux City's ten banks, with capital aggregating $2,200,000 and surplus of $435,000, provide ample banking facilities. The bank clearings for the past four years have averaged $70,087,232.30 annually. The postal receipts for 1903 were $148,270.73.

Bills Brothers, the well-known telephone exchange builders, were awarded the contract to install a complete and modern exchange and the following description will enable the reader to determine how well they have succeeded:

The exchange building of the Sioux City Telephone Company is located on the west side of Jones street, between Third and Fourth streets, somewhat to one side of the business center of Sioux City, but at a point, however, very close to the telephonic center, having in mind the sub-exchanges at Morningside and Leeds.

The front of the building is a composition of red pressed brick and cream colored terra cotta on a base of smooth cut Bedford stone. From this base four terra cotta pilasters rise through the heighth of two floors and support a heavy cornice of the same material, the entire composition being an adaptation of American colonial design. The building is two stories high, with the first floor five feet above the sidewalk, allowing abundant space for large basement windows.

The main entrance is in the center of the front and leads into a vestibule with marble floor and marble steps extending to the first floor lobby. The walls of this vestibule are wainscoted with rich green marble and the woodwork is of natural birch. The same character of wood trimmings is carried throughout the first floor offices, which open off a large public lobby immediately inside of the vestibule.

On the right of the lobby as one enters is the directors' room, and on the left the president's office, each spacious and well lighted and facing the street. On either side of the lobby is arranged the cashier's and bookkeepers' department

and toll and information department. The lobby is octagonal in shape and of considerable size; it is the architectural feature of the interior of the building and presents a very attractive appearance to one entering from the street. Three telephone booths are here arranged, being built into the wall, and each booth being provided with an incandescent lamp and small electric fan, which operates on and off as one enters or steps out of the booth. Over these booths the emblem of the National-Interstate Independent Telephone Association, surmounted by the American eagle, is placed. Opening off from a passage between the lobby are two lavatories, each provided with hot and cold water.

The building is the first fireproof structure constructed in Sioux City, there being no wood whatever entering into the original construction, not even so much as would make a match. The floors are all solid concrete, eight inches thick, supported by steel-eye beams. The partitions are of wire lath with iron studdings, representing what is known as the Roebling system of fireproof construction. The floor of the first floor office rooms is of hard maple, while the floor of the lobby and vestibule is marble mosaic.

All glass throughout the building is wired glass supported by hollow metal window frames, the automatic closing of which is effected by a fusible link, being separated in case of fire in adjoining buildings. The stairways leading to the basement and second floor are of iron, and the doors entering each stairway are covered with metal in compliance with the underwriters' specifications governing the same. The iron columns supporting the two floors are surrounded by wire lath and plaster, affording air space within the enclosure and thus preventing the warping of these columns in case of an interior conflagration.

The roof is composed of concrete, supported on steel beams, with the exception of the skylights, of which there are three extending east and west across the entire building, affording ample light for the examination of the automatic switches. All electric wiring is enclosed in iron conduits embedded in the cement floor and ceiling and is provided with iron cut-out boxes containing a slate switchboard having two fuses inserted.

The building occupies a space of 45x70 on a lot 150 feet deep. It was designed by Wilfred W. Beach, architect, of Sioux City, and the fact that the board of underwriters recognizes the stability of the structure by placing an extremely low rate of insurance on it is evidence of its substantial fireproof qualities.

In the toll operating room, occupied by the New State Telephone Company, which has the contract for the exclusive toll business in and out of Sioux City, is installed the Sioux City company's toll switchboard. This switchboard is of the type known as a relay bridged multiple toll board, with six positions installed and of an ultimate capacity of sixteen positions. This board is quarter-sawed oak, golden finished, and provided with a calculagraph for each position, manufactured by the Stromberg-Carlson Telephone Manufacturing Company of Rochester, New York, who claim that it is not surpassed by any toll board now in service west of Chicago.

On passing down to the basement one may enter the tunnel leading to the main manhole, from which, extending both east and west, are the underground conduits throughout the entire fire limits of the business section of Sioux City, twenty-two ducts of three and four inches diameter extending west, and fourteen ducts, same size, extending east. The cables for the original installation for the 2,000 telephones extending west are 400-pair each, paper insulation with lead sheath. Those extending east are 275 and 375-pair of the same character. These ducts are laid in the usual manner, surrounded by concrete eighteen inches below the surface of paved streets and twenty-four inches below the surface of unpaved streets, allowing ample space for future paving. At the front end of the basement ample space is reserved for two banks of storage batteries ventilated by vitrified clay tile extending through the outside wall to the roof. The door entering this storage battery room is fireproof in its construction.

The steam heating plant is of the Cornell type with a capacity for heating a radiating surface of 3,800 square feet, while the original installation of radiators represented only 1,700 square feet. This excess capacity is considered more economical in operation and ample margin is provided for in case of emergency. Storage for a carload of coal is provided. The floor of the basement is of concrete. An alley on each side of the building affords facilities for the storage of supplies, including wire, cross-arms, glass insulators, etc., which may be passed into and out of the building through spacious windows provided for that purpose.

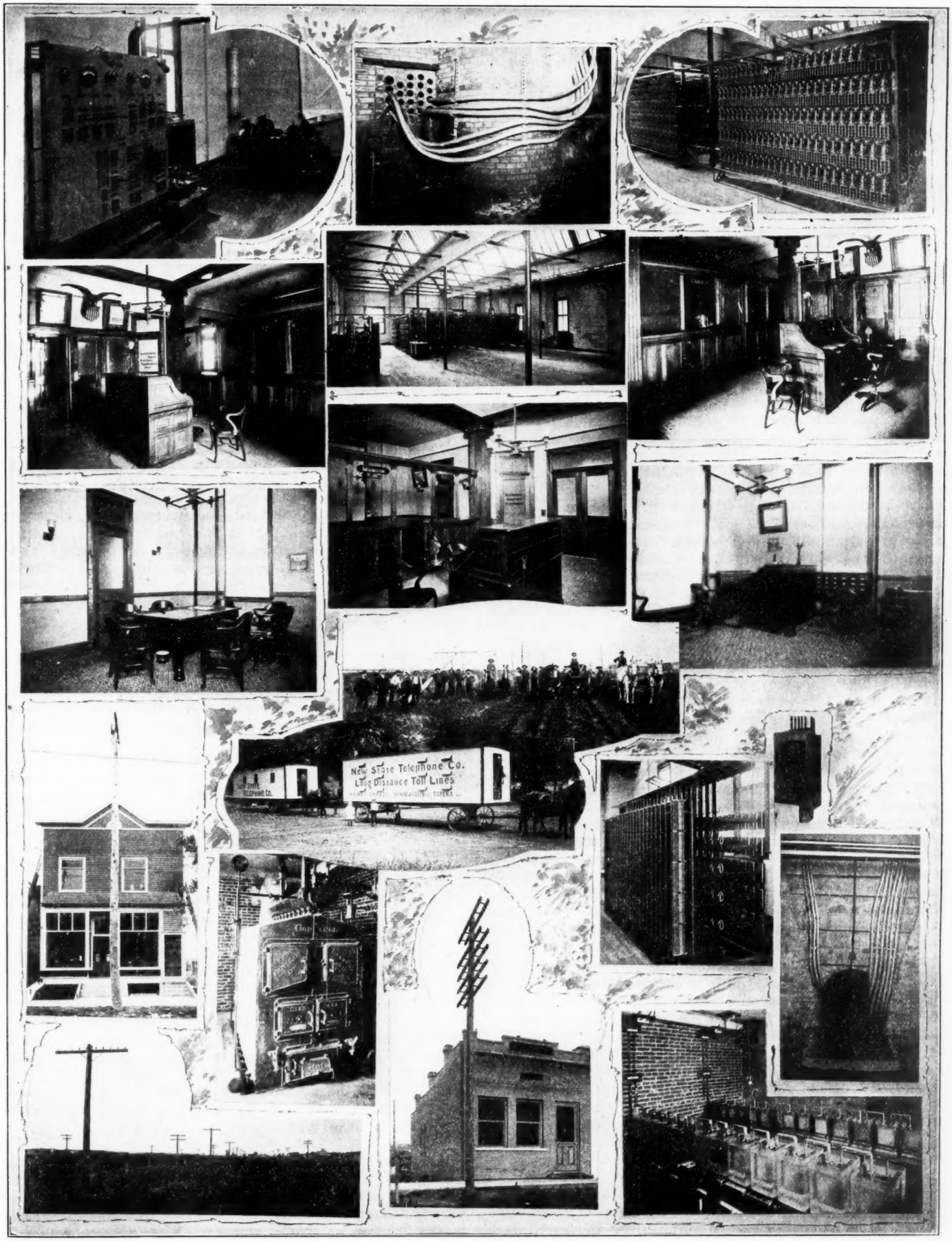
Ascending the iron stairway to the second floor one enters the spacious switchboard room in which the original installation of 2,000 Strowger automatic telephone switches has been installed. There is ample room for future growth, as both the underground construction and building have been designed for an ultimate capacity of 10,000 switches; and, while it was intended to install only 2,000 switches as the initial installation, the management has recently decided to install an additional 500 switches to be prepared to take on the unexpected growth at his early date. In fact, the contract has been entered into with the Automatic Electric Company, for the immediate installation of an additional 500 switches.

A closer view of the switches already installed shows the latest improved form of supporting rack, which has been recently designed by the Automatic Electric Company, this being the second equipment of this type of board which it has installed, the first having just been completed at Columbus, Ohio. The cross-connecting frame is provided for an immediate capacity of 5,000 lines, 4,000 of which are equipped with Cook's latest No. 6 self-soldering heat coils.

The power board consists of four panels of pink Tennessee marble supported on an angle-iron frame equipped with the usual instruments and enclosed fuses, also an I. T. E. overload and underload circuit breaker for the charging of storage batteries. The power equipment consists of a duplicate set of motor generators, the motors being operated from the direct current power circuit of the Sioux City Gas & Electric Company to charge the storage battery. An air compressor, operated by an electric motor is provided for the removal of dust from the switches.

The operation of the calling device of the automatic telephone has been so often described that the general public has become quite familiar with the method. In fact, it has become so generally understood that the following description by a fifteen-year-old Sioux City high school girl demonstrates without any question that it is simplicity itself:

"The exterior form of this telephone is similar to the one in common use. Its distinguishing feature is arranged to revolve immediately in front of party calling. There are ten finger holes arranged on the periphery of the wheel. The numbers are arranged opposite each finger hole, commencing at the bottom and extending upward in serial order, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0. The party in calling, after having selected from the book the telephone number of the person with whom he desires to speak, places his finger in the first hole representing the thousand, pulling down the wheel to a point where his finger comes in contact with a stop. When releasing his finger the wheel revolves back to its original position. He then places his finger in another hole, which represents the hundreds of the number he desires to select. Releasing as before, then repeating operation by placing the finger in the hole representing the tens of the number he is calling, and last, placing his finger in the hole representing the units of the number he is calling, he secures for himself the party desired. He is then in electrical connection, which, by push-



Power Board and Motor Generators. Tunnel Leading to Main Manhole. Switches Already Installed.
View in Lobby. View in Switchboard Room. View in Lobby.
Directors' Room. View in Lobby. President's Office.
Construction Crew of New State Telephone Company and Sleeper and Diner.
Morningside Sub-exchange. Steam Heating Plant. Cross-Connecting Frame. Entrance to Tunnel.
Toll Line Construction. Sub-exchange at Leeds. Banks of Storage Batteries.

ing the button, causes the bell at the telephone called to ring. After talking, placing back the receiver upon the hook restores the mechanism to its original condition, which enables someone else to call the parties who have been speaking."

The outside construction of the entire system, including the sub-exchanges at Morningside and Leeds, is in full keeping with the latest known methods of telephone construction now in vogue, details of which have been published in this journal in a serial article by H. J. Minhinnick.

The exchanges at Morningside and Leeds are equipped with central energy switchboards manufactured by the Sterling Electric Company of Lafayette, Indiana. The electric power for each of these sub-exchanges emanates from the installation at Sioux City, and is under the constant supervision of the attendant in charge of the power equipment at Sioux City, thus reducing the maintenance expense at each of these points. The arrangement of the telephone numbers for these sub-exchanges is somewhat unique. The numbers assigned for the Morningside exchange commence at 6111, for the Leeds exchange at 8111. This enables the subscriber at Sioux City, calling on the automatic device for a subscriber in the Morningside or Leeds exchanges, to place himself in immediate connection through the medium of trunks with the respective sub-exchanges, and thereby confine the switching of the sub-exchanges to their respective places. These sub-exchanges were originally intended to be operated automatically, but on account of the large number of farmers desiring service in both Morningside and Leeds, it was deemed expedient, in order to accommodate them, to place manual operators at these points. At midnight the information department at the main office in Sioux City will be so connected with the Morningside and Leeds trunks that a calling party may receive immediate response to the calls, thus relieving the calling subscriber of any anxiety in regard to the prompt service he will receive.

The official roster of the New State Telephone Company is as follows: Charles G. Cockerill, president; W. H. Leathers, first vice-president; Jos. Mattes, second vice-president; M. M. Head, treasurer; C. H. Smith, secretary. The principals being pioneers in the Iowa telephone field, for several years have been forming a strong organization preparatory to entering Sioux City and have signed up contract at numerous points in the western part of the state, aggregating 15,000 talking telephones within a radius of 150 miles from Sioux City, in Iowa alone, besides 8,000 more in eastern Nebraska and South Dakota, via Sioux Falls. The company is now constructing connecting links to Le Mars. There are four leads, three of which support two cross-arms, all of which indicates that there's "something doing" in the way of telegraphic and telephonic communication in and out of Sioux City. The New State Company is constructing its lead along this same right of way.

The company has adopted the unique idea of boarding the workmen in immense wagons built expressly for the purpose. There are two wagons, one being exclusively for sleeping, having twenty-four bunks, and the other for eating, having a kitchen and dining room. In the accompanying picture the wagon in front is the sleeping wagon and the one in the rear is the "diner." They are each twenty-six feet long, seven feet wide and eight feet high. The "diner" is equipped with doors and windows the same as a house, while the "sleeper" has doors at both ends. They are drawn by horses, so that they may follow the work as poles are set and the wires are strung. Heretofore the men have been boarded at farm houses and in the nearest towns, and it has been extremely inconvenient to get meals and lodging. This is the first enterprise of this kind known to be used in Iowa since the Western Union Telegraph company in the early days of the west was engaged in introducing its system, when similar accommodations were used by the company for its construction men.

The New State Telephone Company's construction men are in charge of P. Cockerill, the superintendent, who is a brother of Charles G. Cockerill, president of the company. Cloyd H. Smith, secretary of the company, spends considerable time with the men. Several hundred miles of lines are to be built during the summer.

IMPORTANT INDEPENDENT TELEPHONE DEALS.

An important deal in the Independent telephone situation in northwestern Iowa recently was concluded, which involves the absorption of all the toll lines, rural lines and local exchanges belonging to the Monona Telephone Company of Onawa by the New State Telephone Company of Sioux City, a million dollar corporation recently formed to conduct the toll business in connection with the new automatic telephone system being installed in Sioux City, the service for which will be ready by the middle of this month. The stockholders of the Monona Telephone Company accept $60,000 worth of stock in the new State Company. Sixteen towns are on the list. The new State Company now owns all of the Independent telephone lines and local exchanges within a radius of fifty miles of Sioux City, including 15,000 telephones in all. Copper trunk lines are being built in Le Mars, Correctionville, Sioux Falls, Yankton and Fremont, Nebraska.

At its recent meeting in Des Moines, the Iowa Toll Line Telephone Company decided to incorporate a clearing house company with a capital stock of $10,000. A committee of five was appointed to draft the constitution. The clearing house will be located in Des Moines. The committee appointed was made up of C. C. Deering, of Boone; E. H. Martin, of Webster City; P. A. Holdoegel, of Rockwell City; J. M. Plaister, of Fort Dodge, and C. G. Cockrell, of Jefferson. The representatives of sixteen Iowa toll line telephone companies were in attendance at the meeting. The clearing house will make out the regular reports of the companies, saving each one the trouble of making out its own report as well as reports of companies doing business over its line and of those over whose lines it does business.

The formal organization of the Northern Ohio Telephone Company has been effected, with the election of the following officers: President, Willard F. Robison; vice-president, H. M. Perrin, of Maumee; treasurer, James S. Brailey, Jr.; secretary, Charles F. Chapman; directors, the foregoing, together with N. L. Hanson, of Perrysburg; T. H. Tracy, Clarence Brown and M. G. Bloch.

The Northern Ohio is the Independent telephone company that was recently formed to take over the exchanges at Perrysburg, Maumee and Whitehouse. It is capitalized at $100,000 ,and it is the intention to acquire other exchanges in Lucas, Wood and Fulton counties. The company is owned by the same interests that control the Toledo Home Telephone Company, with which plant it will work in harmony. Quite a stir was created in telephone circles of Toledo when the fact became known, some months ago, that the Independent had acquired the exchange at Perrysburg. Heretofore, this plant, which was practically the key to the rich Wood county oil field, was identified with the Bell interests, but the Toledo Home capitalists secured control of the stock, and thus added a rich feeder to the local plant.

The first stretch of what the United States government plans to be a big telephone system of its own in Nevada was completed recently, when fifteen miles of wire in Churchill county was placed on a circuit. The new line works in a satisfactory manner. The government will construct many more miles before the end of the year.

Maintenance of Underground Structures

JOHN M. HUMISTON

MANHOLES.

TO AN operating man, the vault is the most familiar part of the underground conduit system. In this subterranean chamber he has to arrange his cables so that they will be out of the way when installing or removing other cables, and has to make splices and tests at all hours of the day or night. There are five important considerations to be observed in the construction of a vault, *i. e.*, the desirability of ventilating the conduit system, the character of the top, the necessity for sewer connections, the possibility of having to maintain a piece of apparatus in the vault, and the removal of obstructions.

VENTILATION AND COVER DESIGN.

If the conduit system is ventilated with openings in the manhole cover, these openings should be guarded to prevent water flowing into these holes from the street pavement and washing street refuse into the vault. Mr. Tailleur of the Chicago Edison Company was, I believe, the first man to suggest guarding these ventilating holes in such a manner as to prevent water running into them. Covers are sometimes made slightly convex on top to overcome this tendency.

The question of ventilating duct systems by these openings in the cover is open to considerable discussion. They do a great deal of good in the summer time, but in northern cities in the winter time they fill up and freeze tight. I once ran across a cover so closed, while the gas from a broken main was escaping out through the pole lateral so fast that a man could not stay on the pole. Manholes sometimes blow up when all ventilating holes are open. Sometimes the holes are responsible for the ignition of the gas, as when a spark is struck by a horse's shoe right over one of them, or when a lighted match is thrown down on the cover. If a gas leak occurs, it is often possible for the regular conduit inspector to ascertain the fact and enable one to investigate, and if necessary get after the gas company. Conduit systems are sometimes ventilated by forcing air into them. This raises the pressure slightly in the ducts so that the tendency is for the air to flow from the ducts outward, rather than for the gas to flow from the surrounding earth into the ducts. It is often possible to make a special pipe, extending from the vault to a nearby pole, curb or building wall. This, I think, offers the best solution of the ventilating problem where it is possible.

There are other features of manhole cover design than the openings for ventilation. The cover must set solidly in the frame so that it could not be knocked off by the calks of a horse's shoe catching, or by a wagon wheel bumping it. I know of one manhole with an old-fashioned frame which had a cover with a projecting flange setting down over the frame. A wagon wheel would strike the cover instead of striking the frame first. The cover was knocked off four times; the first time, the old cover, which was broken at one corner, was replaced by a new one, but this got the same habit. The matter was finally remedied by fixing the pavement around the frame and chipping off a portion of the top flange of the frame so that the cover set flat.

There are two general methods of setting calks to prevent horses from slipping. One, a solid grating of continuous bars clear across the top, the other separate calks about one and one-half inch long by three-eighths inch wide by three-eighths inch high, set alternately in both directions over the top of the cover. The second method gives a calk which wears out much sooner than the cross-bars of the first method.

The metal of which the cover is composed is an important matter. It should be soft gray iron and should have considerable resistance to shock. The tensile strength of the iron could be sacrificed to quite an extent to secure the latter quality. A broken cover in the middle of the night costs much more than the comparatively slight additional cost of specifying a good, soft gray iron. I have known covers to be made in foundries by careless moulders; of two different castings made from the same pattern, one would be a little wider than the other and a little shorter. I had one such cover that was so short that it was possible to see between the edge of the cover and the projecting flange of the frame at both ends. This was due to the moulder rapping his pattern one way only.

VAULT TOPS.

The top of the vault is quite as important as the cover. If the space to be spanned is quite long, it is necessary to use iron. This should be entirely enclosed in the concrete to prevent oxidation. I have replaced a number of vault tops where exposed supporting irons were oxidized to one-half of their original cross-section.

The under side of a vault top should have a slope toward the side walls. In cold weather from one-half inch to two inches of frost is gathered on this under surface, and the presence of a burning gasoline torch is sufficient to melt it. The workman is obliged to melt this off and dry the surface before he can do his work.

A little neck of brick, one brick high, should be built along the edge of the hole in the top, on which to set the manhole frame. This is not always necessary, but in crowded cities it is advisable, as a change in the grade of the street is likely to occur and this may require lowering the manhole cover.

SEWER CONNECTION.

A vault sewer connection has to carry off quite a good deal of dirt, street sweepings, slush and odds and ends of wire clippings. Workmen use cotton waste or newspapers to wipe off mud, and such stuff generally gets in the sewer. Sometimes the adjacent sewer fills up and the manhole becomes temporarily the catch basin. In such a case the remedy, of course, is to request the city sewer department to look after it. If the sewer connection has a backwater trap, this contingency might not arise, unless the trap became clogged. It is well to have the pipe straight and to have a hand hole beyond the trap so that this can be fixed, if necessary, and it is generally necessary. Cable men working in vaults partially full of water have to hunt with a bar to find the sewer connection, and this is likely to break the grating at the vault end.

PRESENCE OF APPARATUS IN VAULTS.

If a vault has to hold a piece of apparatus, such as loading coils or a cable terminal in a telephone system, or a junction box in an electric light system, care should be taken in the design of the vault so that this appliance would be in the best possible location and out of the way as much as possible. The installation of loading coils in vaults is a necessity which will frequently arise in the future with telephone companies. It is my belief that in most such cases it will be a measure of economy to make alterations to pro-

Second installment of paper read before the American Institute of Electrical Engineers, at Chicago.

FIG. 12.

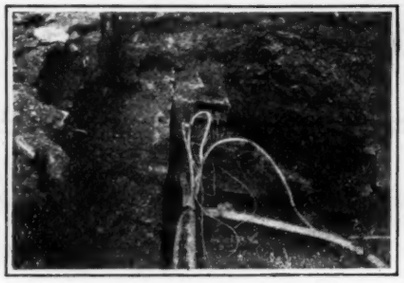


FIG. 13.

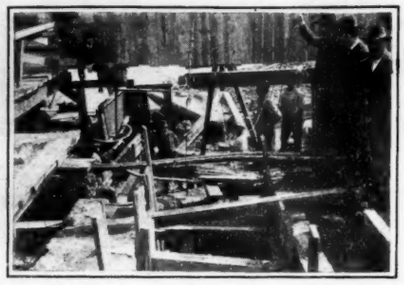


FIG. 14.

vide for the disposition of these coils. This vault should be registered on the records as one requiring special attention, and the regular vault cleaning gang should arrange its route so as to inspect and clean it more frequently than the others.

REMOVAL OF OBSTRUCTIONS.

Water, gas or underground steam pipes passing through a vault are quite objectionable. In a large city it is almost impossible to select a location free from such obstruction, and in many cases it is impossible to secure their removal. The vault should accordingly be designed of sufficient depth so that all of the necessary functions of splicing, pulling cable, etc., can be performed beneath them.

In a telephone system, room is the only item to be considered in connection with such structures. In an electric light system, of course, there are other considerations, making it sometimes necessary to have the roof of the vault entirely below the gas or water pipes, with a neck extending to the surface of the street on which the manhole frame and cover is set.

During the winter of 1903 and 1904 the water in a great many of the vaults with which the writer was familiar was frozen in such a way as to break the walls along a horizontal plane. It was the first winter that I ever knew the water in a vault to freeze, but I know of three cases where this freezing was actually responsible for breaking the structure. There are a number of others that are broken, and which I believe to have been broken during that winter.

DAMAGE CASES.

Frequent injuries to underground structures result from outside interference. This comes about in different ways. Excavators may drive a pick through the structure and cause trouble. They may be careless in making excavations and allow trenches to cave in. Sometimes a slight cave-in starts a leak in a water pipe, making all kinds of trouble.

Abutting property owners on different sides of the street or alley will try to connect their premises by drifting a tunnel or driving a pipe across. If a pipe is driven, it may penetrate a tile conduit, even though it is protected with concrete, and injure the cables. If a tunnel is excavated, the removal of support may injure the conduit, or water or gas pipe, and start a leak, which in the case of a gas pipe may make itself felt by the blowing up of a manhole down the street.

In excavating for foundations for large buildings, settlement in the street or alley may take place, which will injure all of the underground structures involved. Fig. 12 is a photograph showing a settlement of the street. In this case the conduit was pushed out of line. Fig. 13 shows the location of a vault which had been broken by settlement in an alley. The twisting of the conduit line can also be seen.

Of course it is necessary to have the proper relations between the working and the fiscal departments of a company, so that parties responsible for injury from such interference may be promptly billed for the cost of repairs, which their carelessness has caused. Such photographs are invaluable as evidence in a case of this kind.

In a number of cases, building owners desire to make excavations under the alley or under the street. In some instances these extend half-way across the street. The Chicago Royal Insurance Building basement extends almost to the middle of Quincy street on the north. The basement of the Masonic Temple extends to within two feet of the north side of the alley on the north. Conduits being in streets or alleys and in the way of a proposed excavation of course, the owner of the building is obliged to pay for any changes which should be made, but as a general thing, he is inclined to want things his own way and fix matters to suit himself. Such matters should be very carefully considered and no concessions made which would involve objectionable construction or arrangement of cables and conduits, unless proper compensation is received. If the cables and conduits pass through such basement, a carefully drawn contract should be made so that prior rights would not be waived in any particular.

Figs. 14, 15 and 16 (Fig. 15 being a photograph taken from the top of a nearby three-story building) show some rearrangements at the west end of Harrison street water tunnel in Chicago, caused by a leak, due to the slight set-

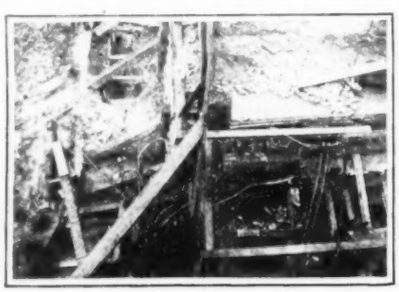


FIG. 15.

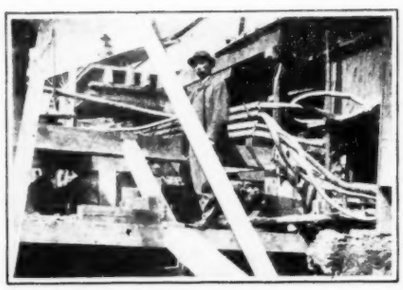


FIG. 16.

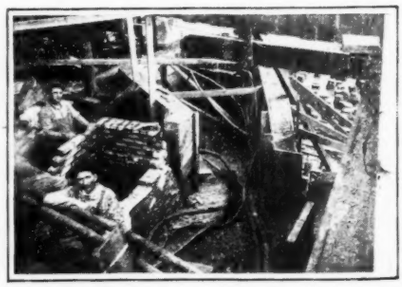


FIG. 18.

FIG. 19. FIG. 20. FIG. 21.

tling of a large water pipe. I might point out in this instance the disadvantage of doing a job in a haphazard manner. The original run of the cables between the water tunnel and the vault at the end of the conduit was made under exceptionally difficult circumstances. The work had to be rushed. It was easier to go through two soft stone walls and make a roundabout connection, as shown, than to go through one wall of the same thickness of solid masonry and make a direct connection from the tunnel to the vault. Fig. 17 illustrates this condition, the upper part being a plan and the lower part being an isometric elevation. This situation was corrected by rebuilding the vault, to include a portion of the tunnel shaft and the end of the conduit, as shown in Fig. 18. The method of doing this so as to require the least planning, and costing the most in execution, would be to cut the cables, place them in their proper positions, and splice them. The method which required the most planning, and which cost the least, was followed. Two pneumatic chisels and a source of compressed air were secured, and about 250 feet of iron was split on both sides. The slack was then taken out of the cables when convenient, all of the work being done during regular working hours.

When this water pipe leaked the resulting cave-in was a very serious matter, dirt for a distance of ten feet below the bottom of the conduits being washed into the tunnel. We found it necessary to remove the manhole cover vault top and knock away all of the brickwork inclosing the conduit. To relieve the load the earth was carrying, a tripod of three fifty-foot poles was erected in the street; from this tripod slings were suspended by half-inch strand. These slings supported the conduit until the necessary repairs had been made and the trench filled up. Fig. 19 shows this tripod as erected in the street.

A case of reconstruction similar to this is shown in Fig. 20. This shows conduit suspended over a part of the street where the intercepting sewer system is being constructed.

RIVER CROSSINGS.

River crossings other than those of aerial wires are sometimes made by laying iron armored cable, known as a submarine cable, in the bed of the river, either directly on the bottom or in a trench excavated for the purpose. In one case great difficulty was experienced in keeping such a cable working for more than six weeks at a time without injury. Sometimes the crossing is of sufficient importance to carry the cables through a tunnel. When this is done it is best to provide separate pipes for each cable. In one tunnel having sloping approaches, with which I am familiar, the conduit is laid straight through; in another one the cables are supported on racks.

In a third tunnel—that built at Harrison street, in Chicago, to carry water pipes across the river—some of the cables are in pipe and some are on hangers fastened to the walls. This structure has a vertical shaft at either end, with a connecting horizontal tunnel. Ordinarily, both tunnel and shaft were full of water. Six three-inch iron pipes were extended from top of shaft to top of shaft. The cables were installed in these pipes. No difficulties were experienced in the maintenance of this cable as long as the tunnel was full of water. Subsequently it became desirable to keep this passage dry, and a pump was installed to maintain it in that condition.

Water had entered the iron pipes through leaky joints and frost reaching the bottom—the change in volume being due to freezing of the water—squeezed the cables and caused trouble. As it was impossible to pull them out in the winter time, they were replaced by cables on hangers on the sides of the tunnel. These cables required occasional inspection to see that they were not disturbed. In spite of this, however, in some way they were dropped to the floor of the tunnel for a distance of twenty-five or thirty feet and one of them fell into the space between the three-inch iron pipes and the wall of the tunnel. The nearest pipe cleared the wall at this point by a space of about one and one-half inches. The displacement of the ground, due to the driving of piles for a new bridge, forced the wall of the tunnel over against the pipe and crushed the cable. The simple expedient of stopping the draft through this tunnel would have prevented the freezing. It is much better to support cables along their entire length and to enclose them, than to support them on brackets. I believe the Chicago Edison Company, in a recently built river tunnel, has provided tile ducts for holding all its cables, although it is desirable to

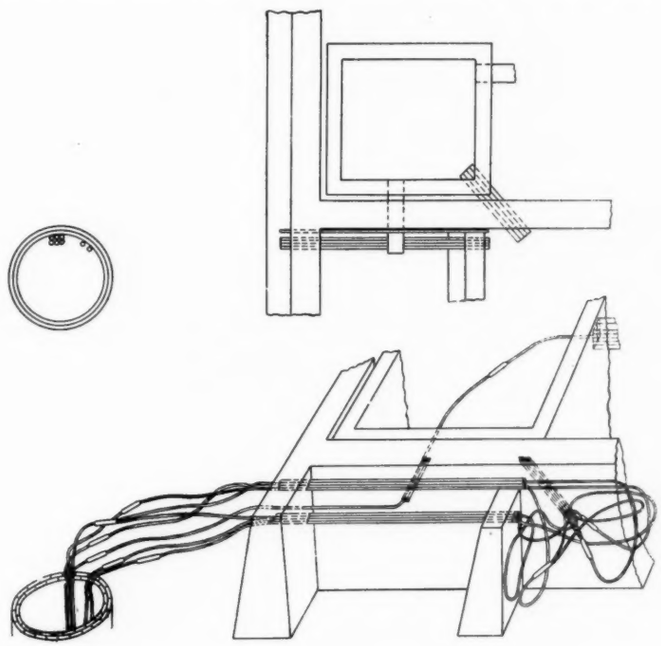


FIG. 17.

have an active circulation of air around conductors carrying heavy currents.

Where the expense of building a tunnel under a river would not be warranted, and where the crossing is too busy for a submarine cable, it is feasible to lay a crossing of iron pipe on the bottom of the river, terminating these pipes in any suitable way on either side. Fig. 21 shows six iron pipes bent up and formed ready to lower from two scows for a river crossing in Buffalo, New York. This was put in place by W. H. Johnston, during the summer of 1904.

ELECTROLYSIS.

The most common method of protecting underground cables against electrolysis is to provide a copper wire of sufficient cross-section to draw off all the current which the cables will pick up, and send it to a point of lower potential. In the case of a simple underground system this is a very easy matter to arrange. In an extensive system in a large city, one encounters perhaps fifteen different operating centers inter-connected by underground mains and with distribution systems, covering a district interlaced with railway tracks, fed from a half dozen or more different power stations, some of which are operated only during hours of heavy load, and others only during certain seasons. At the different junctions in the conduit system, cross connections must be maintained between the cables of the different lines; copper returns must be taken from the points nearest the power station to some point of lower potential, and these must be kept perfectly balanced at all times.

As each power station is surrounded by different points of low potential, which shift at different hours of the day, it is manifest that such a method of protection gives very unsatisfactory measure of security. The city ordinances of Chicago provide carefully for the proportions to be used in designing the street railway system. No measures, however, are taken to keep conditions constant. Some electric light companies are now interfering with the action of stray current by breaking the armor of the cables into sections electrically insulated from each other. A break is made in the armor of the cable. Split hardwood collars are waterproofed in a dense compound and placed outside the cable armor, one on either side of the break. A split lead sleeve is then put around these blocks, and the edges brought together and soldered. The end edges are then hammered into a groove around the outsides of the blocks and the chamber thus made is filled with a dense, semi-solid, viscous compound.

The problem of protecting an underground water or gas system against electrolytic influences is very different from that of an underground conduit system. Unless the cable in the conduit system is under water, it does not offer the facilities for gathering current in the ground that buried pipes do. It is necessary to lay pipes with expansion joints unless they are very deep in the ground. These expansion joints do not offer sufficient conductivity to justify any system of electrical drainage. I was once called upon to investigate the condition of the gas distribution system in a town of about 20,000 inhabitants, where they had had some trouble with electrolysis. The particular case of trouble that brought the matter to a head occurred within 100 feet of the power station. The pipe was laid in cinders thrown out of the station and these probably caused its destruction. All of the other cases of trouble had been on the outskirts of the gas distribution system, but near the railway tracks.

Measurements were made of the current flowing in the pipes paralleling a very bad portion of a line of street railway. These measurements indicated that the pipes were carrying very little current. They were laid with a bell and spigot joint grouted with Portland cement mortar. This probably forms a joint of high resistance. These joints being twenty feet apart in a line of cast-iron pipe would prevent the flow of current in any great amount. The tracks of the street railway system were negative, so it was difficult to account for the corrosion which had taken place on the outskirts of the system. The pipes that had suffered were wrought-iron with screw couplings and extended from the outside ends a distance of probably a quarter of a mile before they connected with the cast iron mains. An inspection of the power station showed that there was no meter on the switchboard. It seemed possible that the system had become reversed without its being known immediately, and the case was diagnosed in this way. The rust on the wrought-iron pipes where electrolysis had taken place was old and did not indicate recent action, and there had not been very much at any time, although it had caused several leaks.

It appeared probable that the street railroad system had several years before operated upside-down for a period of possibly a year. Subsequent inquiry on the part of the manager of the gas company verified this diagnosis. About two years subsequent to my inspection, the gas company installed a station meter. The difference between the readings of this meter and the readings of the consumers' meters, showed a leakage of only about seven per cent. As the return of this street railroad was very bad in places, this demonstrated that if the conductivity of a system of gas or water pipes is made as low as possible, the danger from electrolysis will be slight.

I have had experience since then in a number of other places which confirms this view. One such case was that of the North Shore Gas Company, operating between Waukegan and Glencoe, Illinois. Its line consists of four-inch wrought-iron pipe with screw couplings, and having an expansion joint every 1,200 feet. This line carried a pressure of from twenty to forty pounds, the pressure being reduced at the consumers' premises by regulators. Within a year after the installation of this line, there had been serious troubles from electrolysis. Suitable measures were taken to reduce the conductivity of the pipe system, and these electrolysis troubles have almost wholly disappeared.

(*Concluded next month.*)

TELEPHONE OVER THE GREAT MOJAVE DESERT.

The vast Mojave desert of the west wired throughout with telephone lines is the big scheme which is now on. It will cost more than one fortune to carry out the plans being formulated, but already a good start has been attained. The route includes a line from Needles to San Bernardino, California, also down the west side of the Colorado river to the Santa Fe bridge, and thence to Parker. Another line will extend from Ibex, a station on the Santa Fe, to Searchlight, Nevada, and still another will reach from Barstow to Johannesburg and Kramer. Other lines under contemplation will take in all the towns along the Salt Lake as far as Las Vegas, from which place a wire line will be built to Bullfrog, and thence to Tonopah.

Several months ago the same applicants secured a franchise for a telephone system which covered other desert towns and camps, and with the franchise now asked for the company will have secured control of all the desert regions, bringing in immediate touch with civilization mining camps which are now from two to three days out in the wilderness. It is expected that the contemplated service will prove a boon to the officers of the law, who are now at a decided disadvantage in running down criminals, having no means but the pony messenger route of sending messages from one camp to another.

A direct long-distance telephone line is to be installed from Toledo to Cleveland by the United States Telephone Company. The company will spend $225,000 on extensions during the summer.

Indiana Adopts Ohio Plan

FEELING the need of a closer and more perfect union, commercially and socially, and believing that by a thorough state and district organization this could best be accomplished, a meeting was called by the president of the Indiana Mutual Telephone Association, Theodore J. Thorward of South Bend, for Winona, July 12. About 150 delegates responded to this call, representing 125 companies from all parts of the state. A sub-committee had been agreed upon to meet on the preceding day for the purpose of drafting a constitution and districting the state, so that when the delegates met in the large assembly room of the Winona Hotel on the morning of the 12th, a great deal of the preliminary and detail work had been accomplished.

The committee's report was read to the organization, and after a few minor corrections in the constitution and changes in the districting of the state was adopted. The organization then proceeded to elect George W. Beers of Fort Wayne president. Mr. Beers has from the very beginning been identified with the Independent telephone movement, not only in Indiana, but throughout the entire United States. His practical experience in telephone work, his ability as an organizer and his success as a business man eminently fit him to be the head of an organization of the state which has, it is asserted, shown the most successful and rapid development of the Independent telephone movement of any state in the Union. Charles S. Norton, assistant secretary of the New Long-Distance Telephone Company of Indianapolis, was elected secretary-treasurer.

The state was divided into eleven districts, the counties being grouped according to their commercial and telephonic interests. Over each of these districts a vice-president was placed, the following being named:

District No. 1—Theodore J. Thorward, president South Bend Home Telephone Company.

GROUP OF DELEGATES AT CONVENTION OF INDIANA INDEPENDENTS AT WARSAW, INDIANA.

District No. 2—William L. Moellering, secretary Home Telephone Company, Ft. Wayne.

District No. 3—Walter J. Uhl, secretary Logansport Home Telephone Company.

District No. 4—O. P. Friberg, secretary Lafayette Telephone Company.

District No. 5—Thomas J. Bromley, Jr., general manager Delaware & Madison Counties Telephone Company, Muncie.

District No. 6—Charles R. Duffin, manager Citizens' Telephone Company, Terre Haute.

District No. 7—W. W. Mendenhall, president White Star Telephone Company, Westfield.

District No. 8—A. C. Lindemuth, president Richmond Home Telephone Company.

District No. 9—W. C. Curll, secretary Pike County Telephone Company, Petersburg.

District No. 10—C. D. Knoefel, president Southern Indiana Telephone Association, New Albany.

District No. 11—E. W. Swartout, secretary People's Telephone Association, Aurora.

The address of the president of the association, Theodore J. Thorwald, in which he spoke of the rapid growth of the Indiana Independents, not only in developing their toll lines and exchanges throughout the state, but also in perfecting their service, was listened to with much interest and was well received by the convention. Reports from all over the state indicated an era of good feeling and a determination on the part of the Independents not only to furnish *all* the people with *good* telephone service at *reasonable* rates, but also to stand firm against any encroachments upon the common interests through the buying tactics of the monopoly. A comparative report made from the reports of the various Independent telephone companies to the state auditor for the years 1904 and 1905, indicated the following gains: 30,000 subscribers, $3,521,527 in capital stock, $313,042 in net earnings.

The various districts are expected to hold meetings in their respective territories at once for the purpose of interesting all of the Independent telephone companies of the state and getting them to become members of the state organization, which is itself a part of the National-Interstate Telephone Association, and is organized along the same lines as the state associations of Ohio and Michigan.

With more than $11,000,000 invested in the Independent telephone movement in Indiana, with 170,000 Independent telephones in operation, and with over 400 separate corporations, it is believed that the Independent movement as a whole, in Indiana, is past the danger of being seriously effected by the occasionally manifested buy-up policy at fictitious prices of the financially crippled Bell alliance.

TELEPHONY IN CANADA.

The Ontario Telephone Company has been incorporated at Toronto with a capital of $200,000.

A local telephone system is being formed in Manitou, Manitoba, and a plant will be shortly installed.

The company which is being formed to establish a local telephone system in Russel, Manitoba, and neighborhood is meeting with success and will purchase its plant in a short time.

The board of public works of St. John, New Brunswick, will ask permission of the legislature to establish a municipal telephone system in opposition to the Bell system now in use in that city.

The Campobello Island Telephone Company, Limited, has been incorporated by the New Brunswick government, with a capital stock of $2,000 and head office at Wilson's Beach, New Brunswick.

Application is being made to the present session of the Ontario legislature to incorporate the Ontario Telephone Company. The company proposes to carry on a general telephone business in Brantford and other towns, and to make a specialty of rural connections.

The Stark Telephone, Light and Power Company of Toronto recently held its annual meeting, when the former directors were re-elected. It was decided to declare a dividend at the rate of 7 per cent per annum on the preferred stock in July. The company will erect a new building at Toronto Junction.

The Nova Scotia Telephone Company is preparing for extensive additions to its trunk lines and service in Cumberland county generally during the coming season. The company will put up altogether forty-five tons of metallic wire, which contemplates the construction of new lines and the rebuilding of old ones.

An Independent telephone line is being constructed in the vicinity of Port Colborne, Ontario, the intention being to establish exchanges at Port Colborne, Ridgeway, Fort Erie and neighboring towns and villages. It is also proposed to construct lines for farmers in the vicinity. B. Matthews, A. Spark and J. Ball of Ridgeway are the promoters.

Sir William Mulock, Postmaster-General of Canada, and chairman of the Telephone Committee of the Dominion Parliament, will visit some of the cities and towns of Great Britain, where municipal telephone systems are in vogue. He will report the result of his investigations to his committee upon his return to Canada. He also proposes to consult with the authorities of the British Telegraph Department with a view to ascertaining how the trunk telephone system is being operated in the old country.

The Bellechasse Telephone Company has been so successful in its operations that it anticipates it will be able to double its per cent of dividend the present year. It has always paid a seven per cent dividend every year since its beginning. Its charter authorizes a capital stock of $1,000,000, of which $200,000 is paid up. The company has no bonds and no debts. The system has been in operation about seven years. It started with a small private line and has grown until now it embraces about 1,200 miles of line and 1,300 subscribers.

It seems now to be well understood that the special parliamentary investigation now in progress at Ottawa into the affairs of telephone companies in Canada is intended by the postmaster-general to pave the way for state ownership and operation of the long-distance telephone lines of the Dominion. The expropriation of the Bell Telephone Company's trunk lines will be supplemented by such additional construction as is needed to establish telephonic communication, at minimum rates, from the Atlantic to the Pacific. It is the government's policy to popularize this utility by sweeping reductions in the scale of tolls. The Independent telephone operators' evidence before the telephone committee showed that nothing militates more against the success of their business than the fact that their subscribers are unable, at present, to obtain long-distance connections, the latter being controlled for the most part by the Bell company. Under government operation of these long-distance circuits it is shown that municipalities throughout the Dominion would be able to manage their own telephone exchanges, combining moderate rates with a fair return on the investment.

METHOD OF USING ONE TELEPHONE FOR TWO FLOORS.

A unique device for using a single telephone for two floors is described by F. Ellwood Smith of Somerville, Mass., in the "Wrinkles" department of the National Electric Light Association. In the case Mr. Ellwood describes the company had been using for two years a separate telephone on the up-stairs and down-stairs floors. During the day time the down-stairs telephone was seldom used. A box extending from the first floor to the second floor was then made and in this box was placed the up-stairs telephone, arranging it so it would be raised or lowered something like a dumb-waiter. The telephone wires were connected to two brass rods, which extended from the first to the second floor in the box, and connection was made from these rods to the telephone through sliding contacts which were open-arc lamp carbon brushes. A counter-weight was attached. During the day time the telephone would be at the top, and used in the office on the second floor. At night the telephone would be pulled down-stairs and used there. This has been used for a number of years, and saves the company $75 a year.

Questions and Answers

CONDUCTED BY J. C. KELSEY

I desire a circuit for a two-station intercommunicating system using only four wires. I have to install a two-station system arranged so that either station may call the other without disturbing central, and each station to have access to the exchange line. There is no chance for connection to ground at either station. It is understood that it is impossible to run a fifth wire.—W. M. B.

Your query seems to indicate that you are perfectly willing to run four wires between the two stations, but that a ground wire at either is objectionable. The sketch which I give shows conditions which seem to meet your requirements. You do not say that it is essential that each station call the central office without disturbing the other station, so that this arrangement, which uses the simplest telephone apparatus, does not accomplish that additional feature.

The exchange is indicated at *E*, and two stations at *1* and *2*. At each of these stations the exchange line is equipped with a spring, jack and ringer, which may be either an extension bell or the ringer of the telephone. The remaining two wires run between the two stations only,

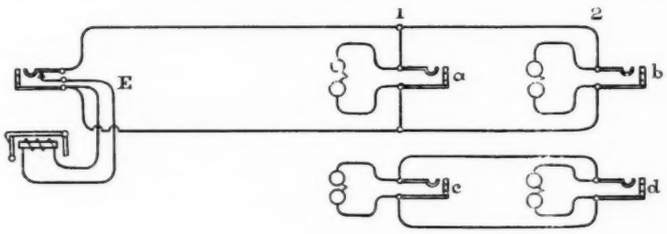


FIG. I.

and are equipped at each end with a jack and ringer. The telephone at each station has its two terminals carried to the two conductors of a plug adapted to fit either of the two jacks at the station.

The operation then is this: To call the central office from a station, plug into the jack *a* or *b*, as the case may be; ringing the central office will naturally ring the other station. To call station *1* from station *2*, plug into jack *d*, and station *1* will answer by plugging into jack *c*, unless the plug is already there.

It is not easy to see why the ground may not be used in some way at each of the stations, and it would seem advisable to secure further freedom from hearing exchange signals.

If you are interested in an arrangement accomplishing these results with fewer wires, but with greater secrecy, I shall be glad to give the matter further attention in the next issue.

From whom in the United States can we buy "the Berlinger receivers and transmitters"?—E. B. S.

The name Berlinger is a new one to me, as they don't advertise in TELEPHONY or any of the other telephone journals. I am not aware of them. The name Berlinger sounds ominously like Berliner which expression should give a good Independent a chill. Even if you could buy Berliner stuff, you would not find it satisfactory. No one ever could buy it.

We have a 400-line exchange along a river bank and bordered by high hills. Is it not a fact that these high hills will serve as a protection from lightning?—J. L. S.

It stands to reason that a few high peaks would serve as good discharge points, and certainly should act as a shield, or at least modify the severity of the discharge. I find that when such a case is looked up that exchanges along hillsides are singularly free from lightning. Now, if a tall line runs over the hills the protection is needed most assuredly, since the tall line is passing so close to the discharge points. One could look upon such a telephone system, at least from the lightning standpoint, as an underground system. It is certainly at earth potential, since a high hill towers over its wires.

About how much will a repeating coil cut down transmission—that is, what is the efficiency of the repeating coil, not only for transmission but for ring through?—J. D. S.

One time on a line between Minneapolis and Fargo. I cut in repeaters until I put the conversation beyond the distinct stage. When ten coils were in transmission was clear as the side tones and other features were lost. The twenty-sixth coil put the conversation out of business. This would mean that each coil cut off four per cent. I would rate the present ring through coils at 95 per cent in efficiency, for transmission purposes.

At what distance can a metallic No. 12 BB wire be satisfactorily used for commercial purposes, standard construction?—E. B. S.

There are many lines sixty miles long giving very good service. As a good transmission proposition twenty miles should be the limit. For tall lines, it will pay every time to put up copper. You can always have a value on your copper, while iron has none whatever, after a little usage.

I have a common return system, 150 telephones, no lightning protection anywhere. What do you consider best, ground return or common return? Why? I have found ground returns more apt to burn out. What style of lightning arrester is most satisfactory, carbons or fuses, or both? I have the "400" fuses on long-distance lines, and do not find them satisfactory, as they do no protect drops.—R. W. B.

I do not know what the "400" arrester is, and can not express an opinion. If it does not protect the drops it is certainly no good, or maybe it is because you do not ground well. A common return is preferable to ground return, as you eliminate many earth current noises. Your system, whether ground or common return, should have carbon arrester protection. The charge which may collect at times on a common return system may grow enough in potential to leap over long distances, or leap through weak spots. The weak spots should be at the carbon arresters to protect the weak line spots of which you are not aware. I would advise both fuses and arresters. The fuses should be very small, and you might as well have a copper wire. In dealing with lightning question, it is well to remember that all of man's ingenuity so far has failed to resist floods of water, floods of air (cyclones), and floods of electricity (lightning). All we can do is to provide a path for the charges of lower intensity to escape, which, while not destructive to life, are destructive to telephone apparatus.

We have a lead of twenty lines running west from town on twenty-foot poles. A railway company is surveying a right-of-way, which will pass under our wires. What procedure shall we take, and at whose expense must the wires be raised? We have had the lead up five years.—L. Tel. Co.

This is really a question for the legal department. There has been considerable litigation concerning who shall foot the bills. It looks as if you were on a private right-of-way. You could keep the railway off. If you have no private right-of-way, and the railroad has condemned the property

looking toward a right-of-way you would have to move at your own expense. I don't want to "knock" lawyers, but if, after a lengthy interview with the railway people, nothing was done, I think it would be cheaper to move than to fight. But this looks like running away. Lawyers cost $50 a day; linemen $2.75. From your side, I would take the lineman end of it. Indiana courts have practically decided that such damages as you may experience should be fought out in court separately from other charges.

Have read your article in July TELEPHONY with much interest. You talk about "bells getting burnt out." My experience with series telephones has been that induction coils and receivers get burnt out a dozen times to the bell once. As you know, one side of the secondary circuit is always on the line and the other side open at the switch-hook. This open place I find does not prevent the secondary circuit getting burnt out. I have always thought telephones ought to be built with both ends of the secondary circuit free of line when not in use. In this connection also I will say that the method of soldering in the induction coil makes it extremely difficult to change the coil in case of burn-out. I much prefer screw connections and have never had trouble from loose connections on coils with screws. I see you recommend good protection at central and none at all at subscribers' stations, when lines are free from ground. Would it be possible to have lines free from ground if carbon arresters were used anywhere with insulation of mica between carbons, thin enough to offer an easier path to lightning than the apparatus does, especially on a common return system where 150 carbons would be on one wire? (Metallic cable from pole to switchboard.)

(a) If one had a common return system entirely free from ground and no protection, or a common return with carbons and fuses everywhere, and consequent grounds, which would you consider better and safer? I have always thought an exchange free from ground would give no invitation to lightning and that one protected with arresters and grounds would attract everything. My subscribers think anything in the shape of a wire draws it. I do know a case where lightning burned up all the telephone wire, stovepipe wire on roof and clothesline wire attached only to buildings.

I also had a case where lightning burned up line wire from pole to house (common return telephone) and did not burn out the drop at central nor any coils in the telephone. It followed duplex wire down the roof to corner, where the wire turned downward; here it split off the siding and shattered a 2x4 scantling; thence it followed the wire through the wall, splitting off more siding where the wire entered. It split off the battery box, ripped the paper off of the batteries, put a clock out of order, tipped over an ink bottle, and then went into the ground, splitting the studding, lath and plaster off. I suppose a ground wire would have taken care of that.

(b) What is your opinion of lightning rods on houses? Do you think a house is safer with or without them?—B. W. B.

A system with carbon arresters would be safer. The reason I don't advise arresters at subscribers' stations without grounds is that a ground wire and arrester will snap and spark, with idle and harmless charges acting on it, thereby frightening people. With arresters at the exchange then it is expected that discharges will jump and no one is frightened. About lightning rods: I pass. They may help matters. I feel helpless when I contemplate anything tending to handle a real stroke of lightning.

As an interested reader of and subscriber for your magazine, I should be pleased to have you describe in your paper one or all of the party lockout systems, such as the Meinema, the one made by the Stromberg-Carlson Company, and the one made by the Baird Company. None of these concerns explain or show diagrams of their systems, hence how is one to determine their relative merits? A superficial description of its general operation and no details of circuits is of no value in such cases. There is one other question I would like to have explained. What is the use of the coil shown in illustrations of the Illinois pole changer? If it is a relay its working parts must be under the base. If a non-inductive coil, how is it connected?—M. R. C.

I am unable to help you in this matter. If any of my readers can come to the rescue I would be glad of it. If the companies had the proper spirit they would give you information desired. This refusal to give information on such subjects, to Independent operators, is detrimental to a good cause, besides, it looks like Bell Telephone Company tactics.

COMPARISONS OF TELEPHONE AND TELEGRAPH EFFICIENCES.

Included in the paper read before the Association of Railway Telegraph Superintendents at Chattanooga, Tennessee, on June 17, written by Mr. Frank W. Fowle, special agent of the railway department of the American Telephone and Telegraph Company, New York, the writer says, under the head of "Circuit Efficiency in Handling Telephone Traffic":

The circuit efficiency—number of calls per day—increases with the number of circuits operated in a group to handle business over one route. The efficiency of a single circuit is usually low, but this has not been the experience in railroad work. Single trunk circuits are handling as many as one hundred to one hundred and twenty-five calls per day. As the volume of traffic over one circuit increases, the average delay on the traffic increases rapidly unless the circuit is one of a group of several circuits. Probably a traffic of fifty calls per day represents the largest traffic that can be handled without delay—giving first-class service. The use of the circuit to pass calls between the operators will occupy about ten per cent of the total time, leaving ninety per cent of the hour for actual circuit use.

It is important from a traffic standpoint not to bridge intermediate way offices on busy trunk lines. Party lines are not economical except when the traffic per station is very small. If a station at some point on a through or trunk circuit has enough business to warrant telephone connection, it is usually the best plan to simplex or composite an iron circuit to the nearest office at which there is a private branch exchange. A busy station permanently connected to a trunk circuit is uneconomical of the line, if the line is of any considerable length.

The operating and the traffic departments of railroads are usually large users of the telephone service, and properly so; the supply department may use the service to a considerable extent, also. The other users should be restricted in order to place the service at the disposal of those in a position to make the best use of it.

The daily message capacity of a telegraph circuit is about two hundred and fifty messages—on a nine-hour basis. Railroad messages are of much greater average length than commercial messages and are not usually condensed to the same extent. The same is true of telegraph circuits that is true of telephone circuits, as regards the increasing delay with increasing traffic. For heavily loaded way circuits, under conditions where the way station attendant is a telegraph operator only incidentally, the telegraph probably handles the traffic as cheaply as it is possible to handle it, if the traffic per station is small.

The relative efficiency of the telegraph and the telephone is a very broad question and one affected by many considerations. The following comparisons are based on a speed of conversation equal to four times the speed of Morse transmission. The average speed of conversation is one hundred to one hundred and fifty words per minute, and the average speed of Morse sending is thirty to forty words per minute. The traffic capacity of one telephone circuit is equal to four straight Morse circuits, two duplexes or one quadruplex. The difference in labor costs is as follows:

8 Morse Operators at $65 per month	$ 520.00
2 Telephone Operators at $30.00 per month	60.00
Difference per month	$ 460.00
Difference per year	5,520.00

The lower terminal operating costs in the case of the telephone offset a considerable charge on the more expensive line circuit. On the basis of a one thousand two hundred-mile standard of transmission, the telephone is more economical than four straight Morse wires for distances up to one thousand six hundred and fifty miles; it is more economical than two duplex Morse wires for distances up to one thousand two hundred miles; and it is more economical than one quadruplex for distances up to nine hundred miles.

The economy of a simplexed telephone circuit, with the Morse side working quadruplex, as compared with two quadruplex circuits, is such that it is the most economical arrangement for distances up to one thousand two hundred miles or a trifle less than this if there are many intermediate exchange switchboards.

The conclusion is that economy in wire use consists in building moderate-haul telephone lines for simultaneous use, arranged to handle the long-haul business by telegraph. When there are special uses for long-haul telephone circuits, they are no more expensive than Morse circuits except for very long hauls above one thousand two hundred miles. On railroad lines where the traffic of transportation is light or moderate, and where one train dispatching circuit and one combined business and commercial circuit are sufficient, the business can be handled most cheaply by telegraph. The very long haul traffic, also, can be handled by telegraph most cheaply. On railroad lines where there is heavy transportation traffic it is usually the case that the traffic of communication is correspondingly large; and this is the economic field of the telephone, worked simultaneously with the telegraph.

Standard Forms of Accounting

THE committee on standard forms of accounting has given careful consideration to the accounting subject, and although it realizes that the various conditions existing in the different telephone companies throughout the country make it almost impossible to lay out an absolutely uniform system of accounting, it is of the opinion that the following outlined system will at least give a very valuable working basis, and can be enlarged on and carried out in more detail to suit local conditions, and if accounts are properly kept along the lines laid out, will enable any company to render an intelligent statements of its affairs.

It should also be realized by the members of this convention that a standard system of accounting cannot be formulated with the expectation that all companies will immediately change their present method without a thorough examination of the advantages of a new system; and we recommend that a permanent committee of three or five members be appointed to consider suggestions for the improvement of the system, making such changes as may be necessary from time to time and to act as an advisory board.

It recommends that the accounts kept in a general ledger be divided into four main groups, *i. e.*, Construction, Operating, Maintenance and General Accounts. The following is a synopsis of all general accounts to be used in connection with this system:

1. Plant. 2. Building and real estate. 3. Accounts received (rentals, etc.). 4. Unexpired insurance. 5. Unexpired directory. 6. Interest on bonds. 7. Treasury stock. 8. Treasury bonds. 9. Construction. 10. Maintenance. 11. Operative expense. 12. General office expense. 13. Salaries and wages. 14. Freight and cartage. 15. Bank accounts. 16. Stable expense. 17. Warehouse supplies. 18. Furniture and fixtures. 19. Petty cash. 20. Tools. 21. Discounts, concessions, etc. 22. Officers' and clerks' salaries. 23. Collecting. 24. Soliciting. 25. Taxes. 26. Insurance. 27. Light. 28. Heat. 29. Water. 30. Legal. 31. Damage and accident. 32. Stationery, printing and postage. 33. Advertising. 34. Directory. 35. Traveling. 36. Pole and right of way rentals. 37. Interest. 38. Capital stock. 39. Bonded indebtedness. 40. Unearned rentals. 41. Surplus. 42. Bills payable. 43. Accounts payable (vouchers, etc.). 44. Accrued interest on bonds. 45. Accrued taxes. 46. Unclaimed wages. 47. Earning accounts (rentals, tolls etc.).

The accounts as above listed represent the complete ledger accounts excepting subdivisions under the heading of construction, maintenance, and operating, as will be hereafter listed. It should also be understood that accounts Nos. 22 to 37 inclusive are general expense accounts, and in many cases portions of the different charges to these accounts will be transferred or prorated to the subdivision accounts under construction, maintenance, or operating expenses, as they may apply. For instance, account No. 24, entitled "Soliciting," should only be charged with that portion of the cost of soliciting which is employed in the maintaining of present business. That portion of the cost of soliciting employed in gaining new business to be charged to the subdivision "Soliciting" under construction. The same will apply to damage and accident, legal, traveling and interest.

The following is a list of the subdivision accounts under the heading of construction:

*Report of Committee on Standard Forms of Accounting, read at the National-Interstate Telephone Convention at Chicago.

CONSTRUCTION.

(A) Pole Lines: This account to include the cost of poles, cross arms, insulators, hardware and all sundry material; including also the cost of setting and planting poles, freight, cartage, wages and cost of handling.

(B) Wires and Cables: This account to include the cost of all circuit wire, tie wire, drop, house brackets, cable, cable hangers, sleeves, cable terminals, and all labor employed including freight and cartage, up to and including the house bracket.

(C) Interior Wiring and Equipment: To this account will be charged the cost of complete telephone instruments, house cable, covered wire, office wire, inside fittings, junction boxes, lightning arresters, and all labor employed in installing same.

(D) Subways: This account to include the cost of manhole frames and covers, eye beams, conduits, cement paving, lateral bends, lumber, and all freight, cartage, labor and sundry materials used in the construction of subways.

(E) Exchange Equipment: This account to include the cost of new switchboard, cable, cross-connecting board, storage batteries, charging machines, ringing machines, freight drayage, and the labor in installing same at the central exchange. This account to be used when plant is extended or improved and in no case should be confused with repairs to exchange equipment under maintenance.

(F) Booths and Pay-Stations: This account to include the cost of all booth, coin boxes, signs and fixtures installed at central offices and pay-stations, freight, drayage and labor employed.

(G) Private Branch Exchanges: This account to include the cost of private exchange, switchboard, and cost of installing complete; and the complete cost of inter-communicating systems, including labor and all materials used, all interior wiring and telephones installed in connection with private exchange switchboards to be charged to subdivision C under construction.

(H) Soliciting: Charge salaries of solicitors for extension of plant as represented by the net gain in telephones. That is to say, if one hundred telephones are installed and fifty telephones taken out during a month at a soliciting cost of $100, charge $50 to construction and $50 to maintenance. Subscribers' changes to be considered as take-out.

(I) Right of Way: This account to include the cost of all rights and permits exclusive of franchises, to construct, operate and maintain pole lines or other equipment along or over private or municipal property.

(J) Franchises: This account to include the cost of city or town franchises, granting the right to construct and operate telephone lines and systems and extensions of original property, including all expenses incidental thereto.

(K) Toll Lines: This account to include the cost of all circuits and pole lines, including labor, freight hauling and sundry materials erected strictly for toll purposes.

(L) Construction Salaries: Charge to this account all salaries applicable to construction work which cannot be distributed in the foregoing subdivision.

(M) Construction Expense: Charge to this account all miscellaneous items of expense not directly covered by any other subdivision.

Note: Further subdivisions of cost of construction may be made if deemed necessary.

MAINTENANCE.

(A) Repairs to Pole Lines: This account to include the cost of repairs to and replacements of materials as listed under constructions, including freights and hauling and all cost of labor employed.

(B) Repairs to Wires and Cables: This account to include the cost of repairs to and renewals of materials as listed under this heading in construction, including freight, hauling and all labor employed.

(C) Repairs to Interior Wiring and Equipment: This account to include the cost of repairs to and replacements of materials as listed under construction, including freight hauling and all cost of labor employed.

(D) Repairs to Subway: This account to include the cost of repairs to and replacements of materials as listed under construction, including freight and hauling and all cost of labor employed.

(E) Repairs of Exchange Equipment: This account to include the cost of material and supplies for the repair of the switchboard, cable, cable shaft and terminal room, distributing board, cross-connecting frame, repairs to charging machines, ringing machines, batteries and the renewal of batteries and all labor employed.

(F) Repairs to Booths and Pay-Stations: This account to include the cost of repairs to and replacements of materials as listed under construction, including freight, hauling and all labor employed.

(G) Repairs to Private Branch Exchange: This account to include the cost of repairs to and replacements of materials and equipment as listed under construction, including freights, hauling and all cost of labor employed.

(H) Repairs to Building: Repairs to company's buildings.

(I) Tool Repairs: To include the cost of all tools when purchased to take the place of tools destroyed or lost and repairs.

(J) Miscellaneous Expense: To provide for all repairs not otherwise specified.

(K) Repairs to Toll Lines: This account to include the cost of repairs to and replacement of materials as listed under construction, including freight and all cost of labor employed.

OPERATIVE.

(A) Salaries and Wages, Local Exchanges: Operators, supervisors, monitors, attendants, etc.

(B) Salaries and Wages, Long-Distance: Toll operators, supervisors, monitors, attendants, etc.

(C) Stationery, Printing and Postage: This account to include the cost of all stationery, printing and postage used in the operating department for compiling records, monthly and daily reports, etc.

(D) Light: This account to include a fair pro rata of total light bills, which is considered applicable to operating according to existing conditions. Balance of light bills to be charged to the general expense account "Light."

(E) Heat: Charge a fair pro rata of total heat bills, which is considered applicable to operating according to existing conditions. Balance to be charged to the general expense account "Heat."

(F) Water: Charge a fair pro rata of total water bills to this account as in the case of light and heat.

(G) Power: Charge entire power bill to this account.

(H) General Operating Expense: This account to include the cost of expense of dining room supplies, hospital, hospital supplies, medical services, traveling expenses and other items incident to the operating department. In the event of meals being sold to operators or other employes, the proceeds to be credited to this account.

(I) Rent: A proportionate amount of rent applicable to operating department.

Committee—H. E. Bradley, chairman; C. J. Meyers, secretary; Charles F. Bender, Charles West, W. W. Grayson, N. S. Vivian, J. B. Ware, P. T. Spencer, H. B. Sale, W. Van Middlesworth.

TELEPHONE GROWTH IN KANSAS.

In 1904 there were 28,025 telephone instruments in the state of Kansas; this year the total is 37,664, an increase of almost 10,000 instruments in one year, says the Topeka (Kan.) Journal. The rapid development of the telephone as a means of communication is one of the phenomena of the day, and Kansas seems to appreciate a good thing.

Last year, the people of Kansas paid to the telephone companies the immense sum of $768,508.40, and this does not include one of the biggest companies of the state, the Independent of Topeka, with its 4,000 telephones in service, which no doubt piled up gross receipts of close to $100,000 more. The Topeka Independent company failed to make any report of gross earnings to the state auditor.

It is estimated that of the gross receipts of $786,508, about $500,000 was received in telephone rentals, and the remainder from tolls for the use of long distance service. If the companies received $500,000 for rentals, it would mean that the average cost of a telephone pear year is $13. This is about what it is in the smaller towns. In some it is as low as $10, but $12 is the ordinary price. In Topeka the price is from $18 to $36 per year.

Some of the telephone companies give their net profits on their investment, and it seems to be about one-fifth of the gross receipts in most cases. There is good money to be made in a telephone exchange in a small town. The extension of the rural telephone is one of the noticeable features of the telephone development of the state. It is probable that about 10,000 of the 37,000 telephones in Kansas are in the country. The rural telephone is doing much to increase the joy of living on a farm.

The last report received shows that there are eighty-three telephone companies doing business in Kansas. Some of these companies cover more than one town. Last year there were only seventy-one telephone companies in the state. Almost every week some new telephone company applies for a charter to do business in the state.

PROCEEDINGS OF THE INTERNATIONAL ELECTRICAL CONGRESS.

The proceedings of the International Electrical Congress have been published in three volumes, and are being distributed to the membership throughout the world. As was anticipated, these volumes form a very valuable addition to the literature of electrical engineering. The work has been issued in two forms—one in paper covers for private binding, and the other in half morocco and green baize. Each volume is carefully indexed, and includes a a roll of members and a list of subscribers to the transactions. There is a total number of 159 papers. These include 2,844 pages. There are 698 line engravings, 124 halftone engravings, and three photogravure frontispieces, making a total of 825 illustrations.

The membership of the International Electrical Congress is geographically distributed as follows: United States and Canada, 1,634; Mexico, Central America, 12; South America (four countries), 7; Great Britain, 139; Italy, 66; France, 46; Germany, 27; Austria-Hungary, 24; Sweden, 11; Holland, 8; Switzerland, 7; other European countries (five), 8; Japan, 39; other Asiatic countries (two), 10; Africa, 4; Australasia, 11; making a total of 2,053. In addition to this there are subscriptions from fourteen countries amounting to 216, making a total of 2,269 subscribers.

The telephone girls of Springfield, Missouri, have a union which is affiliated with the American Federation of Labor.

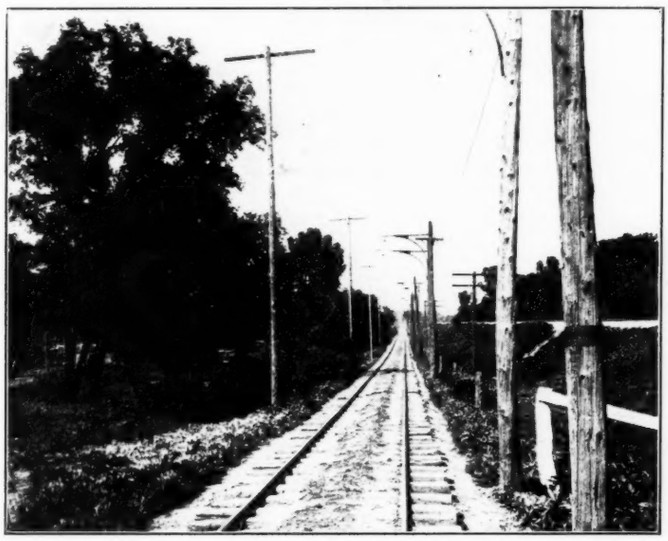
Telephone Construction Practice

H. J. MINHINNICK

CHAPTER VI.

POLES AND POLE FITTINGS.

IN a telephone plant, as in every other complicated mechanism, the strength of the whole is properly represented by the strength of the weakest part, and as a rule, this weakest part is found in the aerial system, including the poles and their various adjuncts. The most excellent central office equipment, the finest underground work and the best cables cannot give adequate service unless the pole lines are built with the most scrupulous



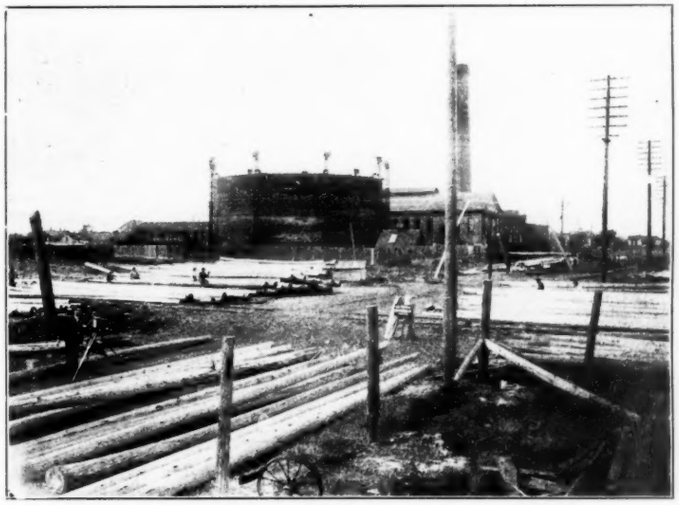
A NICE LIGHT LEAD.

attention to every detail and of the very best materials; besides this it must be borne constantly in mind that the aerial plant is, in the very nature of things subject to deterioration in a greater degree than any other part of the system, and is also subject to damage from storms, sleet and other natural causes, which damage may amount to its entire destruction. It must also be remembered that the cost of the poles represents a very small percentage of the entire investment, so that from any point of view it would appear to be the greatest folly to attempt to economize in this direction. This statement may seem to conflict with one made in the chapter on locations and surveys where it was expressly stated that large savings can be effected in the pole account, but that remark had reference to the *lengths* of poles only, and not to their size, quality or the distances apart at which they should be set.

Several woods are used for poles, including chestnut, white cedar, red cedar, juniper, cypress, tamarack, black locust and yellow pine, but, with the exception of cedar, their use is confined to very limited districts, so limited, in fact, that it is safe to say that 90 per cent of the poles set every year in the United States are either northern or western cedar, the experience of many years having conclusively demonstrated the superiority of this timber over all others, except, possibly, chestnut, which is rarely obtainable. Authorities differ greatly as to the life of cedar poles, some placing it as low as seven years, while others estimate it at fifteen years, or even higher. The writer inclines to the opinion that it is entirely a question of soil and climatic conditions, for he has personally seen poles which had been in continuous service for over thirty years and were still fairly sound, and on the other hand he has known poles to become utterly useless in less than seven years. Under ordinary conditions he would estimate the average life of first-class cedar at anywhere from twelve to fifteen years, with the probability in favor of the lesser figure.

On account of the growing scarcity of this timber, much attention has been paid in the last few years to preservative processes and a careful study of this subject, combined with practical experiment, should be made by everyone engaged in construction work, for, at the present rate of consumption, it is a question of but a few years when the cedar pole will be a thing of the past. There is considerable literature to be had on the subject of timber preservation, and many processes have been evolved which seem to be fairly successful, but only one or two of these are applicable to poles. The following extract from Trautwine presents the chemistry of decay very concisely:

> The decay of timber is caused by the growth and activities of fungi. The minute spores of one of these fungi, germinating on a piece of wood, send out fine threads, which enter the wood cells and soon give off a complex compound called a ferment or exzyme, which dissolves certain parts of the wood fibre. The dissolved fibre serves as food for the fungus. The threads throw out branches and sub-branches, and soon the timber is permeated by a mass of such threads, the growing parts of which give off ferment. The action of the ferment changes the chemical and physical properties of the wood, rendering it, in some cases, like brown charcoal, in others white, soft and stringy, and the wood is said to be rotten or decayed. Eventually, some of the threads grow out from the surface of the timber, and form toadstools and other excrescences. Under these are found cavities containing thousands of spores, which, when ripe, are blown off into the air and settle upon other timbers, where the process is repeated. Moisture and heat are favorable to the growth of the fungi, as are also the starches, sugars and oils found in the cells of the sapwood, but wanting in



POLE YARD.

the heartwood. If protected from the action of these fungi, wood will last indefinitely. If air is excluded, as when timber is kept constantly and entirely immersed in salt or fresh water, the fungi can not thrive. Sap, confined in timber with air, ferments, producing dry rot, as where beams are enclosed air-tight in brickwork, etc., and where green timber is painted or varnished, or treated with creosote, etc. The sap then not only prevents the thorough penetration of the oil, etc., but may cause the greater part of the wood to rot, although its outer shell gives it a deceptive appearance of strength. Sap should, therefore, be first removed by seasoning; i. e., either by drying the wood in air at natural or higher temperatures,

or by first steaming the wood under pressure, so as to vaporize the sap, and then removing the latter by means of a vacuum. Thorough seasoning of large timbers in dry air at ordinary temperatures may require years; and too rapid kiln-drying cracks and weakens the wood. But it is questionable whether steaming and vacuum remove the sap as thoroughly as do the slower dry processes. Alternate exposure to water and air are very destructive. It causes wet rot.

An inspection of these remarks will demonstrate two important propositions: (1) Poles must be thoroughly seasoned, and cut when there is little or no sap flowing, *i. e.*, in the winter or late autumn; (2) the danger point is just above and below the surface of the ground where the pole

POLE LINE AT CEDAR RAPIDS.

is alternately wet and dry and exposed to the air. Granted, therefore, a thoroughly seasoned pole, if we can protect it at the point where it enters the ground, we will have done everything possible to preserve it. Creosote or dead oil of tar is admittedly the best known preservative, but unfortunately its thorough application (which requires that the sap be first entirely evaporated and the wood then filled with the oil under pressure until about eight pounds, or practically one gallon, are injected into each cubic foot of the timber) is so expensive that it is out of the question. There are, however, several creosote preparations on the market, which are applied by simply painting them on the pole, and a considerable degree of success has attended their use. In any case they are so reasonable in price that the experiment is well worth trying. Several large companies use applications of crude petroleum, effected by pouring a gallon or more into a small trench dug around the pole and so allowing it to soak into the wood; the trouble with this is that the oil soon evaporates and the application must be renewed at least yearly, but, if this be done, there is reason to believe that the result will warrant the expenditure.

Processes employing mineral solutions, such as corrosive sublimate, chloride of zinc, blue vitriol, etc., have not been nearly so successful as the creosote treatment and are not well adapted to use on poles, as all these solutions wash out very readily. Painting is about the poorest preservative that can be imagined, and at the risk of being considered extreme the writer must confess that he would never paint a pole except under compulsion, and this for several reasons. In the first place a painted pole is a perpetual eye sore, for the staring color makes it invariably conspicuous, whereas after a neatly shaved pole has become weathered, a line (especially through trees) is hardly noticeable; in the next place paint is very apt to hasten the formation of dry rot by preventing free evaporation of sap and moisture; and lastly, one can never judge the strength of a painted pole, as the entire heart may be rotten and the outer shell protected by the paint may appear perfectly sound. All northern cedar is marketed by the members of the Northwestern Cedarmen's Association, which has put out the following standard specifications:

All poles must be reasonably sound at the top end, cut from live timber and peeled. Poles must measure as follows:

4 inches	12	feet
5 inches	15	feet
6 inches	18½	feet
7 inches	22	feet
8 inches	25	feet

Twenty per cent butt rot is allowed on all poles and a crook one way, but not to exceed one inch in every five feet in length, measuring from a point six feet from the butt.

The above pole is commonly classed as "reasonably straight," or "commercially straight." It is not intended that all poles shall have twenty per cent swamp rot or such extreme variation. A variation of one foot in length is allowed, i. e., a thirty-foot pole may be thirty and one-half feet or twenty-nine and one-half feet."

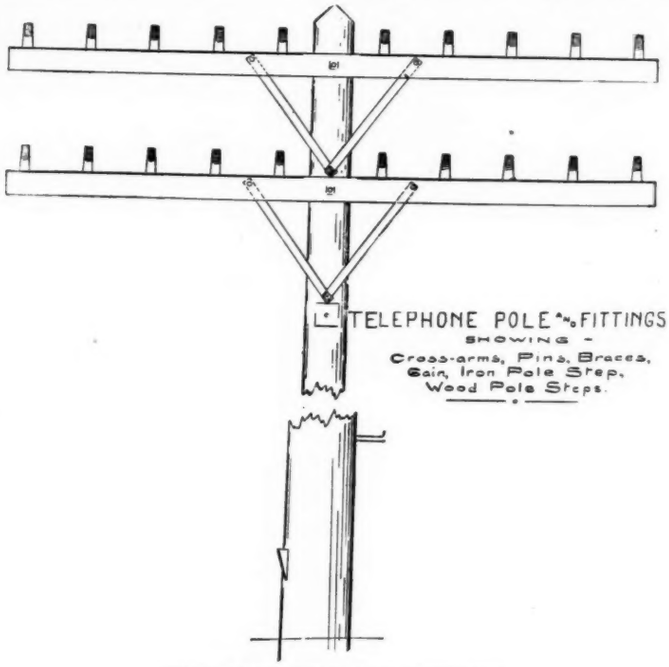
With a few important additions the foregoing specifications would represent good practice. Among these may be mentioned the following:

(1) All poles to be winter cut.

(2) The upper three-fourths of the pole to be absolutely sound.

(3) All knots to be trimmed close, and poles with large or loose knots to be culled out.

In purchasing northern cedar it is not usual or necessary to specify butt sizes, except in the short lengths, as the butts are apt to be too large rather than too small in poles over thirty feet long. The following table of weights is put



TELEPHONE POLE AND FITTINGS.

out by the same association and is approximately correct for dry poles:

Length	4 in.	5 in.	6 in.	7 in.	8 in.
20	100	130	175	210	
25	150	200	250	350	450
30		275	350	450	575
35		400	450	600	730
40			625	800	
45			835	1,000	
50			1,035	1,250	
55			1,300	1,550	
60				2,000	
65				2,700	
70				3,400	

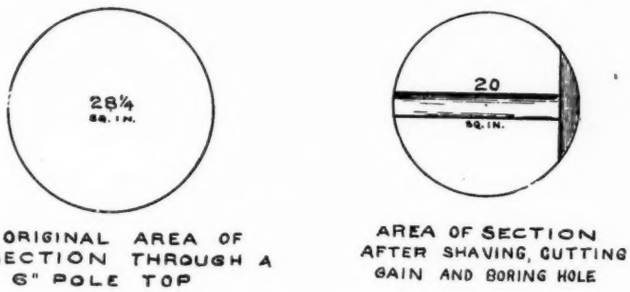
The western cedar is practically free from butt rott, is beautifully straight and can be had in all sizes and lengths,

eleven and twelve-inch tops and lengths up to 100 feet being by no means uncommon. Butt sizes should be carefully specified, as this timber grows so straight and slender that the butts are very apt to be too small for the length; the following table represents first class practice.

Length.	Top.	Butt.
70	11	20
65	11	19
60	11	18
55	10	17
50	9	16
45	9	15
40	8	14
35 and 30	7	13

In this table it will be noticed that the smallest top is seven inches, and for first-class work nothing less should be considered, as a six-inch pole is not fit to carry a single arm, let alone two or three. The shaving will reduce a six-inch top to something less than 5½ inches; the gain will take out at the very least one-half inch more and the 11-16-inch hole for the bolt will still further reduce the cross section. The accompanying cut shows a section through the center of the gain drawn to scale, and a very simple computation will show that the original area, which was approximately 28¼ square inches, has been reduced to less than twenty inches.

Next in importance to the poles are the cross-arms and pins. The former are made from fir, Norway pine and long-leafed yellow pine in the south; the fir arms are put

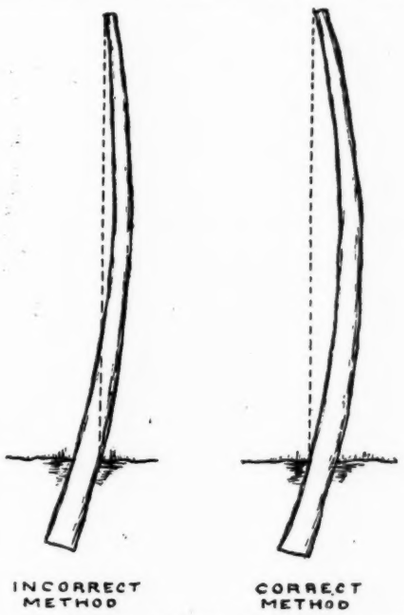


SIX-INCH POLE TOP BEFORE AND AFTER FINISHING.

up without paint while the others may be either painted or creosoted. The trend of the best practice seems to be toward either the fir arm or the creosoted pine, and either of these will give entire satisfaction. Arms are made in two sizes—"Standard," 3¼ x 4¼ inches and "Telephone," 2¾ x 3¾ inches—and in varying lengths, according to the number of pins. The following table shows the details of both kinds:

No. Pins.	Length.	—Spacing— End.	Center.	Sides.	App. wt. in lbs.
2	24	3	18		6
2	30	3	24		7
4	42	3	16	10	9
6	62	3	16	10	13
8	82	3	16	10	17
10	102	3	16	10	21
12	122	3	16	10	26
		STANDARD ARMS.			
2	36		28		9
4	48		16	12	12
4	60	4	18	17	15
4	72	4	22	21	18
6	72	4	16	12	18
6	96	4	18	17.5	24
8	96	4	16	12	24
8	120	4	17.5	15.75	30
10	120	4	16	12	30

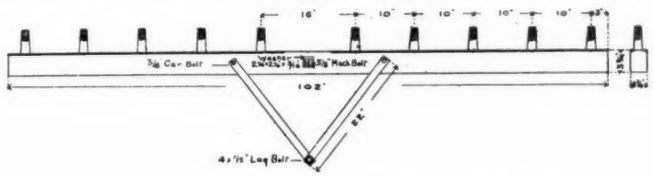
In exchange work, the ten-pin arm is almost universally used, and the writer would most earnestly advise that the "Telephone" arm be never considered, as it is entirely too light for the strains to which it must be subjected, unless it be strengthened by an iron brace around the pole, as illustrated. This brace may be had from any of the supply houses, and its use certainly makes beautiful work, as it not only doubles the strength of the arm, but prevents the unsightly twisting and tipping always caused by heavy drops. On the other hand the "Standard" arm is unnecessarily long for telephone purposes and the manufacturers will reduce the length to 102 inches and bore the arms for 1¼-inch pins, if so requested. All arms should be of thoroughly sound timber and free from large knots and must be



INCORRECT AND CORRECT METHOD OF SETTING CROOKED POLE.

closely inspected, as a weak arm may easily mean a seriously injured lineman and an expensive damage suit. Any arm should stand the following test—holding it by one end the other should be struck on the ground with as much force as a man can use, under which treatment it should show no sign of distress.

Modern practice has eliminated the oak pin, unless it be creosoted, and locust is practically the only wood used for this purpose. The accompanying drawing shows the most approved dimensions. For telephone work, there is no advantage in using pins larger than 1¼ inches if they are made of first-class locust and the 1½-inch pin is not often



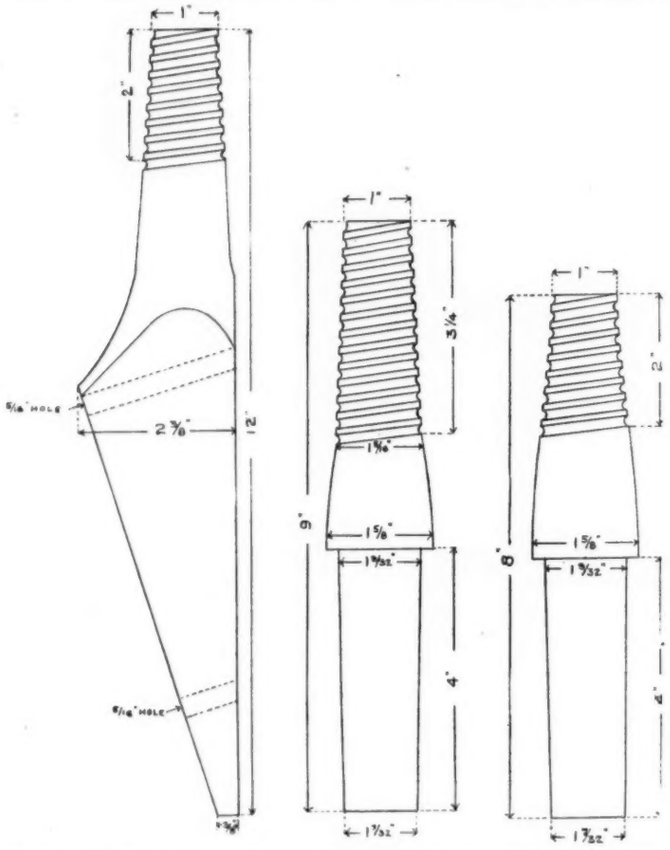
PONY TELEPHONE ARM. PINS AND BRACES.

seen. Steel pins with wooden tops are used largely by telephone companies, but have never become popular in telephone practice; it is hard to see wherein they present any points of advantage.

The remaining pole fittings are the bolts, braces and steps and these may be dismissed with a very few words, as they are thoroughly standardized. The arms are attached to the pole by ⅝-inch machine bolts passing through both arm and pole and fitted with a square galvanized washer 2¼ x 2¼ x 3-16 inches under both head and nut. The old practice was to attach the arm by two 7 x 1½-inch lag bolts, but this method is never seen in modern exchanges. The braces are of galvanized iron 17-32 x 7-32-inch and from 20 to 26 inches in length, 22 inches being the most commonly used; they are attached to the arm by ⅜-inch carriage bolts, the length depending on the size of the arm—3½ inches for telephone arms, four inches for

standards—and to the pole by ½ x 4-inch lag bolts. The accompanying drawing shows the detail of an arm so fitted. The pole steps, the lowest of which is set ten feet above the ground, are of galvanized iron 9-16 x 9 inches and should be driven about four inches into the pole. Below the iron steps wooden blocks are used, spiked to the pole by a 60-penny nail through the upper hole and a 40-penny nail through the lower. The illustration shows both size and shape of this block.

Having thus briefly described the pole and its ordinary fittings we will follow it from its arrival in the yard until its final setting and the attachment of the arms, steps, etc. When a load of poles is received it will be noticed that it is held in position by heavy stakes set in sockets attached to the car, which stakes are prevented from spreading by two sets of wires running from side to side, one set at about the middle of the height of the load, the other at the top. The first step in unloading is to throw a heavy rope around the middle of the load, the end next the yard being securely

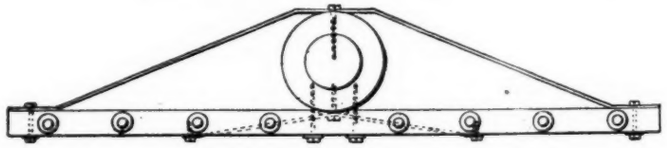


STANDARD BRACKET. TRANSPOSITION PIN. STANDARD PIN.

fastened to one of the truss rods of the car, while with the other, two or three turns are taken around the opposite truss rod, all possible slack pulled up and the end of the line belayed to some convenient point. Not less than four heavy skids are then placed from the ground to the floor of the car so that the poles will roll down an incline instead of falling several feet. These skids should be at least ten feet long, and a convenient practice is to notch the upper end so it will fit down into a stake socket, and thus be prevented from slipping when the load comes on it. If the car contains very heavy poles it may be well to use three or four thirties in place of the lighter skids as shown in the accompanying photograph. The lower set of tie wires is cut *on the side next the yard* so that the poles will settle in that direction; the upper ties of the center stakes are cut and these stakes chopped out; a man frees the end of the binding rope and makes ready to slack the poles down; the remaining ties are cut and the end stakes chopped out when the entire upper part of the load will settle into the rope and roll down the skids to the ground without danger, or breakage.

By this method every possible precaution against accident is taken, for if the stakes should break off unexpectedly the rope would hold the poles at least long eonugh to allow the workmen to escape and when the last stake is cut it prevents the poles starting off the car too quickly with the attendant chance of breakage. When unloaded the poles are neatly piled, each length by itself, and the shavers and framers can commence work. The shaving should begin at a point five feet from the butt and from this point the pole should be thoroughly cleaned up, all knots trimmed smooth and all bark and rough spots removed. The foreman should see that the shavers cut as little wood from the pole as possible, for there is no sense in unduly reducing its size; at the same time enough must be taken off to give the pole a neat appearance. The shavers must be taught to hold the draw knives properly—that is, with one end much closer to the body than the other so that the blade will form an angle of about thirty degrees with the cut; this will reduce the labor at least one-third. If several men are shaving one man should be detailed to trim down knots with a sharp hand axe and assist the others in getting poles into place, etc.; the draw knives should be kept sharp and, as stated in the third chapter, the warehouseman can well employ his spare moments in grinding the extra knives so that no time will be lost in the yard.

Framing is too often entrusted to unskilled and inexperienced labor and the writer has frequently heard managers and even superintendents boast that all their framing was



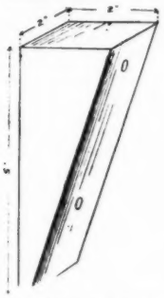
DOUBLE ARMING BRACES.

done by groundmen. It is only fair to say that their pole lines bore such evidence of the truth of the statement that the explanation was unnecessary. As a matter of fact, the appearance of a line of poles depends more largely upon proper framing than upon any other one factor; there may be some little excuse for a pole set a trifle off the line but there is absolutely none for one improperly framed. If a pole were perfectly straight it would not make any difference where the grains are cut, but in practice there is no such thing as a straight pole; the bend may be very trifling, but it is always there, and must be reckoned with. If the pole is bent in one direction only, the process of framing is very simple; the top end being placed on the horse the pole is turned until the crook is down, which is best determined by sighting from the center of the top to the center of the butt and turning the pole until the line joining these two points coincides with its center line. If there be a crook in both directions the problem becomes one of considerable difficulty; the best results are obtained by sighting at a point six feet from the butt and then turning the pole until the line joining the points of sight splits the difference between the crooks.

Of course, a pole having a heavy bend in two directions would be rejected, but it frequently occurs that there is a silight crook both ways and good framing requires that both bends be taken care of. Having placed the pole to his satisfaction the framer marks the center line of the top, measures four inches down each side on small and five inches on large poles and cuts the roof; measuring from the top of the roof down the center line of the pole he locates each gain, making a pencil mark at the top and bottom; from the bottom of the roof to the top of the first gain is usually two inches. The distance in the clear

between gains is commonly sixteen inches, but is sometimes reduced to fourteen inches and occasionally on toll line work it is increased to eighteen and even twenty inches. It is good practice to cut four gains in thirty and thirty-five-foot poles and five in all the larger sizes; a straight-edge can be made with the gains marked at the proper distances and its use will save much of the time consumed in measurements.

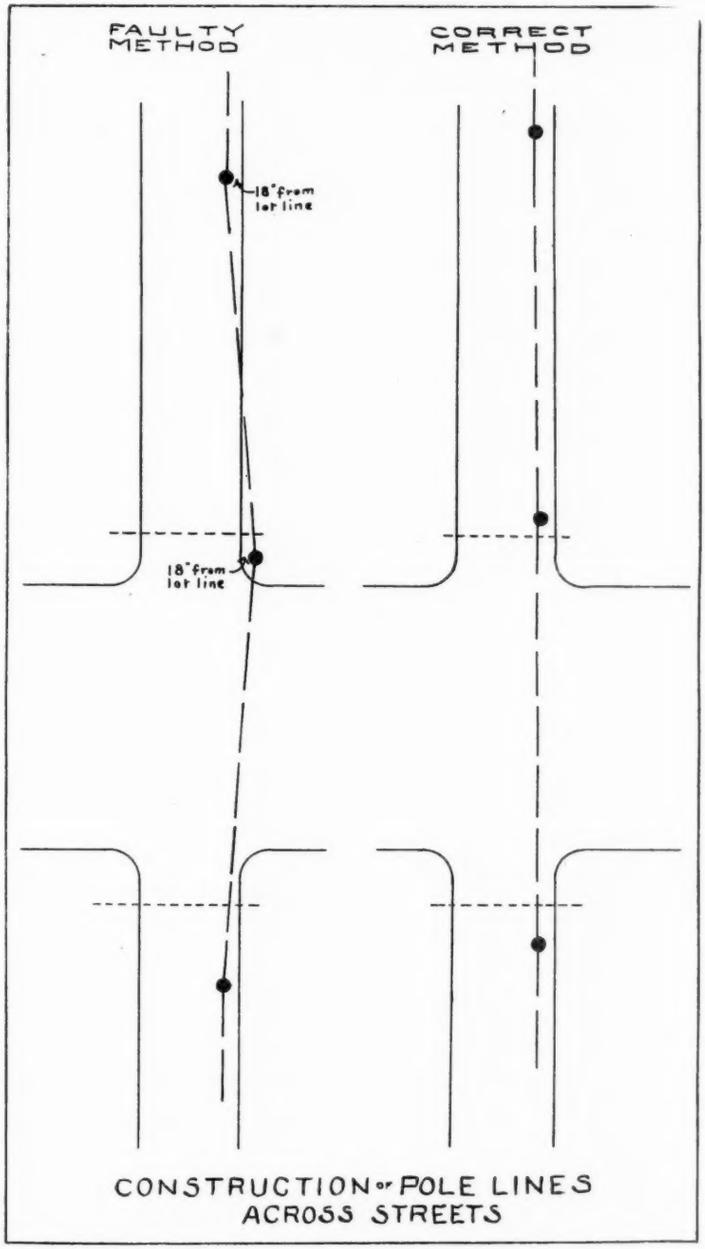
Beginning at the lower gain the framer makes a saw cut on either side not exceeding three-fourths-inch in depth at any point and removes the wood between the cuts with the framing chisel; he places one of his squares in the gain thus formed and sights down the pole to determine if the edge of the square forms a right angle with the center line more wood being removed from one side or the other until this result is effected. The other gains are cut in the same way, but instead of sighting each with the center line they are made to conform to the one just cut, the square being left in this and the others compared with it; an 11-16-inch hole is then bored exactly in the center of each gain and the operation is complete. If the pole is to be double-armed a corresponding set of gains must be cut on the opposite side of the pole and the process is substantially the same, except that each of the new gains is lined up with its mate by the use of the squares, the perpendicular distance between the edges being made the same on both sides; the bolt holes should be bored before the second set of gains is cut and great care taken to bore them true. Holes for the steps are bored about three inches deep at intervals of three feet on each side of the pole, this work being done by groundmen; the top step should come between the third and fourth gains and the lower one about sixteen feet from the butt. On no account should the holes for the steps exceed three inches, and to insure correct boring a small section of wood or iron pipe should be slipped over the shank of the bit, so that it will be impossible for a careless workman to bore too deep.



WOODEN POLE STEP.

The choicest poles in the yard should be reserved for cable and other double-armed poles and corners and the foreman should receive a list of these as early as possible, so that he may put them aside. Orders for special gaining such as buck-armed and other similar poles, should be given in plenty of time before the poles are wanted, so there will be no delay in getting them out.

The preliminary surveys will have determined the approximate location and size of each pole, but the line must be definitely staked before the holes can be dug. It is common practice to trust the curb and alley lines and to set the stakes by measuring from these, but everyone who has had anything to do with city surveys will understand that this method can produce nothing but unsightly pole lines, for the curbs are apt to vary several inches in a block and the alley lines are generally determinable only at street intersections. The almost universal rule is that the center of the pole shall be eighteen inches from the curb, or from the side of the alley, and the best practice undoubtedly is to set the transit over a known point, the ranging pole over another as far distant as possible and then set the intermediate stakes without reference to the lines of curb or alley. If the district be paved or even curbed there will be no difficulty in finding these known points, but if the streets be entirely unimproved the city engineer must be asked to give the necessary data, which he is always able to do from his records. In running through an alley it will be often necessary to take an offset toward the center so as to obtain a clear sight; in this case it is well to set over 6½ feet, so that an even five feet from the line will give the correct position for the stake. It is generally advisable to drive the stakes flush with the ground, as many people seem to have a foolish idea that they can do some damage by pulling them up; the writer recalls one instance where almost every stake in an alley run of several blocks was either pulled out or moved in a single night. In staking the line the notes of the original survey should be followed as closely as possible and any necessary changes should be entered in the field book. In running through an alley no pole should be set at a street intersection, unless absolutely necessary, for a



FAULTY AND CORRECT METHODS OF CONSTRUCTING POLE LINES

a reference to the accompanying sketch will show that such a pole must be at least two feet out of line, owing to the fact that the curb returns on the alley line, while the poles are set eighteen inches inside it. This necessitates the use of alley arms on all poles so set, and if there be a cable the messenger must be supported on angle iron brackets so made as to carry it out the proper distance from the pole. The detail of these brackets will be taken up in the chapter on guying and messengers.

Another point must be carefully attended to and that is

to secure ample clearance over railway tracks. The following circular letter issued from the office of H. C. Hope, Superintendent of Telegraphs and Signals of the C. St. P. M. & O. R. R. Company, presents the matter so concisely and convincingly that it is reproduced in full and requires no comment, save that every operating company should carry out the suggestions therein made:

St. Paul, Minn., April 20, 1905.

Gentlemen:—I attach for your information duplicate of reports just received from our foreman of unsafe crossing of your wires over our track at place mentioned above. When we say unsafe, we mean that any one of several probable contingencies may intervene and cause trouble and which might make your company amenable for heavy damages. We refer particularly to wire striking our trainmen. These are not rare occurrences. About two per year is the average on this road, and they are all caused where wires sag down or are placed too low. In this connection it is proper to advise that highest car at present is 15 feet 7¼ inches from top of rail to running board, allowing for a six-foot brakeman, expansion of wire, contraction in winter pulling poles closer together, thereby shortening span, a twenty-five-foot clearance will take care of these present conditions, but to provide for future higher cars, deterioration of material in crossing, and to guard against other contingencies, it would seem best to make the clearance from rail to lowest wire at least thirty feet. One of our trainmen has just been struck under the chin by a telephone wire breaking next to crossing pole, and as only single brackets were applied it slipped through tie and sagged down and struck brakeman. This shows that either double brackets or double crossarms, the latter preferred, should be applied to each crossing pole and each wire doubly tied on each side of the span.

We double bracket or double crossarm our own wires and keep them high enough for our own protection, and in twenty years we have not had a case of one of our own wires striking a man on cars. It is always the other fellow's wire that does the damage. This shows that our specifications for crossings have stood the test of time and I attach a copy.

Please do not misunderstand us. We are not asking any favor. We give you the benefit of our experience and certain definite facts that cannot be successfully disputed. In the face of these we believe it to your interests and a duty we all owe to these trainmen to rearrange crossing as suggested by our foreman, opposite question No. 10 on his report.

It is well that the holes should be dug as soon as the line is staked out and the transit party should keep not more than a day or two ahead of the digging crew. Unless it is desired to push the work with unusual haste not more than eighty holes should be dug per day, as the pole derrick will not average more than this number and it is essentially bad practice to keep holes open a moment longer than necessary. A good digger will put down from eight to fifteen holes per day, the number depending entirely on the quality of the soil. The following table shows the correct depths for the various lengths of poles; the diameter of the hole should be at least six inches greater than that of the butt of the pole:

25 to 30 feet, 5 feet depth.
35 feet, 5 feet 6 inches depth.
40 feet, 6 feet depth.
45 feet, 6 feet 6 inches depth.
50 to 55 feet, 7 feet depth.
60 feet and over, 8 feet 6 inches depth.

It is also highly important that each hole be dug in precisely the correct place—that is, the stake should be exactly in the center of the hole. The writer has found it excellent practice to have a man armed with some brains and a short handled shovel keep ahead of the diggers and start each hole. This is particularly advisable in running through choice residence streets where the parkings are sodded, as this man will carefully remove the necessary sod and lay it aside to be replaced when the pole is set. It would hardly seem necessary to say that the earth dug from the hole in such locations should be placed on the street and not on the sod, but unless strict watch be kept over the diggers they are sure to get a handsome parking into an unsightly and dirty condition. It is the failure to observe these small details that renders it so difficult to get right of way through residence districts.

The foreman of the digging crew should be furnished with a list showing the locations of the stakes and the length of pole to be set at each, which length may also be marked on the stake before it is driven; he will see that all holes are of ample size and depth and that they are dug truly straight and not tapered in at the bottom. He should also see that before the digger leaves a hole he covers it up securely so that children cannot meet with accident by falling into it. A copy of this list is made for the pole yard foreman, on which are noted also all cable and other special poles, and he will load out the poles called for in regular sequence, beginning at one end of the line. A stout thirty or thirty-five-foot pole should be set at some convenient point in the yard and guyed, leaning over the road at such an angle that the top will be above the center of a wagon standing beside it; a pair of blocks is attached to this pole by a sling near the top with the fall running through a snatch block at the foot so that the poles (first hauled to place at the bottom of the sheer pole by a team kept in the yard for the purpose) can be quickly loaded on the wagons as they come in. In this way the hauling out teams are kept constantly moving and no time is lost by delays in the yard. The poles being distributed along the line, each at the correct hole, are set by the derrick, as described and illustrated in Chapter II, or piked into place, if no derrick be used.

In setting with the derrick the pole is rolled to the hole and the wagon backed into position so that the point of the boom is as nearly as possible directly over the hole. A

UNLOADING POLES.

chain is then slung around the pole at a point which will almost, but not quite, cause it to balance when lifted, the excess weight being, of course, on the butt end. A good eye and some experience are necessary to determine this point readily, but a few days' work will enable the foreman to judge it with great accuracy. If the pole be extremely heavy the guy lines from the end of the boom should be fastened to some convenient points, but unless the pole be over forty-five feet long this is hardly necessary. The team being unhitched from the wagon the fall line is attached to the double-trees and the horses easily and rapidly raise the pole, while a couple of men guide the butt into position over the hole; when all is in readiness the pole is lowered into place, the foreman unhitches the chain and the derrick moves to the next hole. As stated in a former chapter, one of the greatest advantages of this method lies in the fact that the pole can be easily guided through or across obstructing wires. From the moment it leaves the ground it is under the most absolute control—can be swung in any direction, pulled forward back or sidewise and steered past interfering wires, which would of necessity have to be cut if the pole were raised by pikes and a jenny. The procedure by this method is too familiar to need description, and it will suffice to make one little suggestion, and that is, that it is much cheaper to furnish a piece of plank 2 x 6 inches and 7 feet long on which to slide the butt into the hole than to pay for three or four broken tamping bars per day.

A lath should be tacked into one of the gains before the pole is raised so as to facilitate the sighting for correct

alignment of the cross-arms. Whatever derrick or pikes be used for the setting the subsequent operations are the same. The pole is straightened up and held in position by four pikes; it is then faced in the proper direction by a cant-hook applied at the butt and the pikes are grounded. The foreman goes ahead to the next hole and first aligns the butt with that of the last pole set. This point must be carefully attended to and, if necessary, the hole must be enlarged on one side to permit the butt to be brought into correct alignment; he then sights the top with those already set and when the pole is truly in line, both top and bottom, the pikes are firmly grounded. In the meantime another man has stationed himself at a point at right angles to the line and, as soon as the foreman has completed his share of the alignment, this man straightens the pole from his point of view, and, if necessary, has it turned until the lath in the gain stands exactly at right angles to the line of the poles. In toll line practices the poles face each other alternately, but in city work the arms should all face from the cable pole, except on the pole immediately ahead of it, on which they face the other way. The reason for the difference is readily apparent—on a toll line there is a definite number of continuous circuits and the strain on the arm is equalized by facing them first in one direction and then in the other, while in city practice pair after pair is dropped so that practically all of the strain is away from the cable pole, at least to within a span or two of it; therefore, as stated, the first pole out is faced in the other direction. It is most excellent practice to double-arm this pole, as well as the cable pole, and also to rake it slightly toward the latter. When the pole is finally approved from both points of view the hole is filled and thoroughly tamped; to effect this the earth should be shovelled in slowly so that the tampers will be able to compact it as solid as possible. The old rule of one shoveller to four tampers will give excellent results, *if the tampers work.* When the hole is about one-quarter filled a final sight should be taken to make sure that the pole has not moved. The tamping is continued until the surface of the ground is reached and a few shovelfuls of earth banked around the bottom of the pole. Any remaining dirt should be neatly spread, if in an unpaved street or alley, and gathered into a pile for subsequent early removal if on paving. The accompanying photograph shows a most excellent line of poles and also a well framed and guyed corner pole.

Lest the writer may seem to be praising his own work he would add that this line was built by that sterling construction man, J. H. Weidermann of Cedar Rapids, Iowa, whose pole lines at that point have been the occasion of much favorable comment.

The various methods of setting poles in swampy or other extraordinary locations will be discussed in the chapter on toll lines, as such conditions will hardly occur in city work. When a pole line is finally set it should present the following features: All butts should form an exact line; all tops should be similarly in line; view from the side each top should be exactly over the outer edge of the butt and the gains should be precisely at right angles to the line. A failure in any one of these particulars means a ragged and unworkmanlike job, and the third one is deserving of explanation, as it is perhaps the most frequently neglected. As already stated a crooked pole is framed so that the bend will come in the line and in setting great care must be taken with the sighting to see that the top and butt are truly perpendicular *without any reference to the other parts of the pole.* The common fault is that the man in sighting allows his attention to be distracted by the crook and does not set the top sufficiently ahead. The accompanying drawing shows two poles—one set properly, the other as is too often seen.

NOTE.—The subject of poles and fillings being of such vital importance, it has been found impossible to do it justice in one chapter. The next installment will treat of steel poles, self-supporting poles, cross-arming, etc.

DEFIES FOG BY MEANS OF SUBMARINE TELEPHONE.

The Lucania of the Cunard line came into port several hours late on account of the thick fog off the coast, through which she was guided with the assistance of a new and remarkable invention, says the New York Globe of recent date. This invention is a sort of submarine telephone, by the aid of which Captain Watt, standing on the bridge of his ship, was able to communicate with and determine the location of the lightships off Nantucket, Fire Island and Sandy Hook.

These three lightships are fitted with submarine bells. During the heavy fog these bells, by the aid of an electrical device, tolled off the numbers of their respective ships. This sound, carried through the water, struck against the great steel "shadow"—to use a new scientific term—or receiver. The sides of the ship also acted as a sounding board, and the far-away tinkle of the lightships' bells was gathered into the "ears" of the vessel—two small boxes, sixteen inches square, fastened inside the ship in hold No. 2, in the forward part of the vessel, and twenty feet below the water line. By ordinary telephonic wires these sounds reached the captain's ear as he stood on the bridge. Nantucket was picked up three and a half miles away, the bell ringing 66. Two and a half miles from Fire Island the lightship's tinkle was heard, while Sandy Hook was caught at about the same distance.

Sound travels in the air at the rate of 1,100 feet a second; but the air is a fickle conductor. Sound travels in the water at the rate of 4,400 feet per second—four times the rate at which it traverses the air, and water is always the same as a conductor—there is never the slightest variation.

Captain Watt expressed himself as greatly pleased with the device.

"I have no doubt," he said, "that when the invention is perfected we shall be able to talk by wireless under water."

J. B. Millet of Boston is the inventor. The Lucania is the first big liner to carry the equipment. Mr. Millet is now in England, introducing his invention. The British navy will probably be equipped with it for squadron use.

WISCONSIN COMPANIES CONSOLIDATE.

The consolidation is reported of the Fox River Valley Telephone Company, operating 1,300 telephones at Appleton, Wisconsin, and sixty miles of toll line, together with a number of farm lines radiating out of Appleton, and the Valley Telephone and Telegraph Company of Green Bay, Wisconsin, which is just completing an exchange of 1,000 telephones at Green Bay and another of 300 at De Pere, with connecting toll and farmer lines. The name of the new organization is the Fox River Valley Telephone and Telegraph Company. It will cover all of that section as soon as lines can be built. All parties in both companies having stock retain their full interest. Jones & Winter, the well known firm of telephone engineers and contractors, of Chicago, are heavily interested in these and other Independent properties in Wisconsin, as well as in Texas and Illinois, and have associated with them in these enterprises prominent Chicago capitalists. They have built in the past few years about sixty exchanges, and every one of the number has proved successful and all are operating as Independent exchanges to-day.

The Cuyahoga Telephone Company of Cleveland has arranged to add several more sections to its switchboard, owing to the large amount of new business it is taking in.

DIGEST OF TELEPHONE LITERATURE

Conducted by Samuel G. McMeen.

Combined Telephony and Telegraphy—McMEEN.—*Telephony, July.*

A paper written to be read at the National-Interstate Independent Telephone Convention at Chicago. By the present accepted methods of combining telephony and telegraphy on the same wires at the same time, it is possible to obtain a telephone and a telegraph circuit over one wire with ground return. With telephony over a two-wire line, being the ordinary metallic-circuit telephone line, it is possible also to obtain two independently operating telegraph circuits, or to obtain one telegraph circuit with some details of operating advantage on the telephone circuit. It is not yet shown to be possible to obtain both telephone and telegraph service simultaneously over a single wire without reducing in some degree the quality of the telephone service; the principal commercial application of such a plan is to put telephone equipment on existing telegraph lines and thus to obtain some kind of telephone service without interfering with the working of the telegraph instruments, rather than to modify existing telephone lines for telegraph purposes. The addition of telephone equipment to an existing telegraph line is accomplished by the use of rather delicate apparatus for signaling, or more than usually powerful transmitters and of receivers of less than usual sensitiveness. Any metallic circuit telephone line which is good enough for quiet telephone service may be made to furnish one telegraph circuit by having impedance coils bridged across it. Long telegraph circuits may be built up of a series of short telephone circuits, if desired, the short telephone lines retaining their individuality for talking, signaling and switching as before the introduction of the telegraph feature; also, in a telegraph circuit constructed in this manner, a way-station may be inserted, either between any two of the telephone links, or at any point in any one of the telephone lines. In switching telephone lines having telegraph service by means of bridged impedance coils, condensers or repeating coils are necessary in the cord pairs to prevent the passage of the telegraph currents to lines not involved in the telegraph circuit, and to prevent the confusion of telegraph currants on two or more telephone circuits which may belong to different telegraph lines and yet be switched together for telephone purposes. It is necessary also in such a system of telegraphy to provide the operators ringing upon such lines with ringing generators without a ground connection, or to take ringing current for those operators through a transformer so that the ground usually found upon the ringing generator may not interfere with the working of the grounded telegraph currents. A telegraph line may be secured from a telephone line by the use of repeating coils inserted in the line at the point where the telegraph circuit is taken from the telephone circuit; this method has not the disadvantages of switching and ringing which are found in the impedance coil method, but the loss in the talking qualities of the telephone line is greater. Circuits have been devised by which, with the use of impedance coils and condensers, two telegraph circuits may be obtained from one metallic circuit telephone circuit, but not without some special provision for sending telephonic ringing signals over the circuit thus used.

GENERAL.

National-Interstate Telephone Convention—Telephony, July.

A complete report of the convention held at the Auditorium Hotel, Chicago, June 20, 21 and 22, 1905. The business meetings of the convention are reported verbatim throughout.

Telephone in Spiritualism—Telephony, July.

A Columbus, Indiana, woman has asked that a telephone be installed at her husband's grave. She says that she has conversed with him when at the grave side, and believes that with a telephone located at the grave the spirit of the dead one will answer when she rings up.

Milo G. Kellogg's Work—Western Electrician, June 24.

A statement of the work which Mr. Kellogg is at present developing, and which promises to be of interest to the Independent telephone field in the course of the near future.

The Telephone at the Battle of Mukden—SULLIVAN.—*Electrical Review, July 1.*

An entertaining review of the methods used by the Japanese army, and by which it was possible for Oyama to keep in touch with all parts of a 100-mile army front and to direct the movements of the different parts of his army to the best advantage and co-operation. The article is illustrated with a map of the district.

Telephone in School Work—Electrical Review, July 8.

A recent patent (971,573, June 6, 1905) covers a method of adapting the telephone to instruction purposes in schools where pupils of defective hearing may be taught. It includes transmitters for the teacher and receivers for the pupils, with switches whereby any pupil or set of pupils may be connected with the teacher's transmitter; provision is made further by which the quantity of transmission to any pupil may be regulated by the degree of assistance any pupil may be regulated by the degree of loudness required by that pupil to enable him to hear properly.

Telephone Eavesdropping in California—Electricity, June 21.

A new law has gone into effect in California which makes it an offense punishable by imprisonment for anyone to eavesdrop on a telephone line and then discuss the conversation.

Making Telephone Cables—McLEAN.—*American Telephone Journal, June 17.*

An illustrated description of the cable making methods used in the cable department of the Stromberg-Carlson factory, Rochester, N. Y.

Wireless Telephony—American Electrician, July.

A method of wireless telephony is described, the transmitting station being equipped with a microphone, battery and induction coil, the induction coil being one of high ratio of transformation and having one terminal grounded, the remaining terminal being left open, or connected to an aerial open coil. The receiving station consists of a receiver only, the receiver terminals being connected one to ground and the other left open or connected to ground at a point more remote from the transmitting station; if the receiver poles be both grounded at the same point or at points equidistant from the transmitting station, there will be no speech received; antennae do not seem to improve the received speech. Sound may thus be transmitted "over several kilometers," especially over water, if induction coils with high transformation ratios and a microphone which will stand strong currants be used.

Telephone a Device of Satan—Telegraph Age, July 1.

The National Conference of the Old German Baptists has adopted a resolution ordering all the members of the church to discontinue the use of telephones. It is argued

that the telephone is a device of Satan, that it makes people lazy, and that there is no warrant in Scripture for its use.

Life-Saving Telephones—American Telephone Journal, June 24

Steps are being taken to install a system of telephones for the use of the life saving patrol along the New Jersey coast, to enable a patrolman to communicate quickly with the life saving station. At present, when a vessel is seen in distress, the patrolman must run back to the station, thus losing valuable time.

Chicago Trunk Circuit Diagram—American Telephone Journal, July 8.

Just a picture, but an eye-opener to one who has only a vague opinion of the problem of trunking between central offices in a large city.

Correct Time Over Telephone Circuits—American Telephone Journal, July 15.

This idea has been put into practical operation in France. A microphone was arranged so that each beat of a standard clock in the observatory could be heard in the telephone receiver; by a prearranged system of omitting a certain number of beats, or other arrangement of the signals, it is possible to identify a given signal as true noon. This is useful for watchmakers, etc., and also for navigators, who by having telephone connection at the wharf or at an anchorage buoy can regulate their chronometers when in port by an observatory standard; this was done in the case of a French warship at Brest with an accuracy of .1 to .2 of a second.

Telephone Versus Telegraph for Fire Alarm Systems—Telegraph Age, July 16.

According to the authority of Adam Bosch, superintendent of the fire alarm telegraph system of Newark, New Jersey, the telephone cannot possibly make a good substitute for the telegraph in reporting fires. On receiving an alarm from any box, every company knows instantly whether they must respond or not, and it is not seen how a telephone system can accomplish this.

Submarine Telephone Signals—London Electrician, June 16.

Some buoys off the coast of Nova Scotia are fitted with submarine bells which can be heard a distance of five miles, and certain vessels have been fitted with telephonic receiving instruments by which the sound may be detected. The Canadian government has contracted for a number of similar equipments for other points.

The Telephone Committee.

The various technical journals recite from week to week the progress of the investigation being made by the Canadian telephone committee.

Bells and Telephones—RYAN.—*London Electricity, July 7.*

The first of a series of articles which has its object in the education of contractors and workmen. This first paper deals with vibrating electric bells only.

Australian Telephones—London Electrical Review June 23.

It is reported that the new Federal Postmaster General has decided to signalize his term of office by connecting Melbourne and Sydney by telephone.

Standardization of Equipment—Telephony, July.

The report of the committee on standardization of equipment for the Ohio Independent Telephone Association:

EQUIPMENT. The switchboard should be chosen to meet future as well as present requirements; common battery system should be used when ultimate growth will reach 300 to 450 lines; if power for common battery is not available, magneto system should be used for exchanges of ultimate up to 450 capacity; above 450 lines it is advisable to put in a power plant to obtain the advantages of common battery system; special magneto farm-line positions should be installed to give service to farmers' lines. On farm lines not more than eight telephones should be connected to one line, with a divided circuit, ringing four on each side of the line; the farmer's telephone should be arranged to ring a station on his own line without ringing central. For town subscribers, full selective party lines should be used if common battery, and divided ringing if magneto; not more than four subscribers should be placed on one line in the limits of the town; pole changers should be used for ringing. For exchanges exceeding 450 town subscribers, a common battery multiple switchboard should be installed, the number of lines per position being from 120 to 160 according to traffic. For exchanges of 450 to 6,000 lines, jacks not less than 7-16 centers should be used; from 6,000 to 12,000, jacks not less than 3/8 centers should be used; lamp jacks should be all metal. In large exchanges, an out-of-order tone test should be used; a three-wire line circuit should be adopted; the wire in multiple cables should be not smaller than No. 24 nor larger than No. 22, B. & S. gauge. Two-conductor cords with positive automatic signals are recommended. Answering jacks of pay-station lines should be grouped; as also for measured-service lines; a key for splitting the cord pair should be used in such cases. An intermediate distributing rack should be furnished; sneak current and lightning protection should be installed on both sides of all lines; a voltage of twenty-four to thirty is recommended for common battery installations. The positive side of battery should be grounded in all cases. Trunks should have busk-back tone signal; "A" positions should have not less than fifteen pairs of cords; "B" positions should have not more than thirty trunks; breast-plate transmitters are best; battery circuits should be wired to fulfill the requirements of the International Board of Fire Underwriters; pilot lamps should be used on each operator's position and should be multipled on chief's desk; chief's, monitor's, observation and trouble desks should be provided as needed; an emergency lighting circuit should be wired to the switchboard from the storage battery. Several automatic systems have been installed and have given satisfaction, but are not recommended. Transmitters should be tested for long distance service before being purchased, and for local battery should be about twenty-five ohms, for common battery from fifty to one hundred ohms; the receiver should be bipolar, and strongly constructed; the resistance of a common battery receiver should be 40 to 60 ohms, and a magneto receiver should be 100 to 125 ohms; the receiver cord should be particularly high grade, as it is a source of very annoying troubles. Induction coils for local battery instruments should be of a high quality of material, design and construction; induction coils should not be used in common battery installations. Ringers should be capable of adjustment to great sensitiveness; use 1,000 ohms, long core, wound with No. 38 wire; for party lines use 1,600 ohm coils; for series telephones use 80 ohm coils. The hook switch should be platinum pointed. A two or three ampere line fuse should be connected on each side of the line at the junction of the drop wire and interior wires, and a 1½ ampere fuse at the cable box, and at the instrument itself, when it is connected to an open wire circuit, heat coils and lightning arrestors should be used. Interior wiring should be No. 18 or No. 19 B. & S. gauge copper insulated with best quality rubber to 5-64 inch, with a durable saturated braid. The method of wiring should conform to the International Board of Underwriters. Toll operators should not be overloaded, and should be at same boards as "A" operators up to two or three toll operators; tubular, hand-restoring drops are recommended. Visual busy signals should be used if the toll lines are multipled. All cord circuits at the toll board should be alike if possible. The trunks from the toll board to the local boards will be governed in nature largely by the type of local board used.

The Old Way and The New—JUDSON.—*Telephony, July.*

Beginning with a description of an Iowa exchange, twenty-five years ago, which was strictly central energy, other than the energy of the patron himself, the writer describes the advantages of a modern well-built telephone plant.

Portage, Wisconsin, Telephone Plant—Western Electrician, June 24.

The exchange at Portage was started over ten years ago with fifty subscribers and an ultimate capacity of 100 lines. In two years the ultimate capacity was exhausted. The exchange was rebuilt for magneto system, but was equipped with apparatus which should be changed to common battery system when desired without loss of apparatus from discarding unnecessary parts; the exchange now is working with common battery system, and has four operators' positions in the central office; the switchboard is working with local trunking or transfer circuits, but the equipment is so designed that at will the multiple of the lines may be put in and the trunks discarded, thus giving a full multiple common battery board with the minimum change of apparatus involved. The central office is housed in a building built and owned by the company, and thoroughly fireproof. Cable has been used in the outside plant wherever it has been thought advisable. The plant is one typical of what a good independent plant should be, and the managers estimate the annual depreciation on the entire plant to be less than two and one-half per cent. The article is illustrated.

Los Angeles—TONSTEAD.—*American Telephone Journal, June 17.*

An illustrated description of the telephone equipment of this city, with its many branch offices and its combination of manual and automatic working.

Amsterdam, New York—CROFT.—*American Telephone Journal, June 17*

An illustrated description of a plant of 2,000 telephones' capacity in that place.

Intercommunicating Apparatus on the S. S. Oceanic—ANDERSON—*American Telephone Journal, July 15.*

Telephones for use of the officers of the ship, which must be installed in exposed positions and must be reliable through all kinds of weather, require special engineering details to enable them to serve the ends required. Two such sets for the forward and after bridges of the White Star Steamship Oceanic are illustrated, and their details discussed.

Harmonic Party Line Systems—DEAN.—*American Telephone Journal, June 17.*

History is reviewed and modern systems are discussed, particular attention being given to the systems designed by the author of the article, he having done the most practical work in this field.

Multiple Testing Apparatus—TYLER.—*American Telephone Journal, July 1.*

Description and circuits, with method of operation, of a device for testing the multiple equipment of large switchboards.

Home Made Wire Chief's Desk—American Telephone Journal, July 8.

Carpenter's details and electrical circuit diagrams for a wire chief's table. The circuits may be modified to fit different equipments.

Theory and Construction of the Pole Changer—CONKLIN.—*American Telephone Journal, July 1.*

A discussion of a piece of apparatus which is becoming more and more widely used in small telephone exchanges.

The Pole Changer—CONKLIN.—*American Telephone Journal, July 8.*

A continuance of the article begun in the preceding issue of the Journal.

Telephone Lamps—Electrical World and Engineer, July 15.

A German company is making a double filament lamp, the second filament acting as a guard to indicate when the first filament has burned out. A high-resistance filament is inserted in the lamp in shunt with the ordinary filament, and when the latter burns through, the high-resistance filament glows with a dull glow, sufficient to disclose the calling line in conjunction with the pilot lamp, and also sufficiently different from the usual illumination of the lamp to indicate that the service filament is no longer whole.

Cuba Automatic Telephones—Electricity, July 5.

It is announced that 15,000 automatic telephones have been sold for use in Cuba.

Telephone in Fire Helmet—Electricity, July 5.

A fire helmet now under trial in Manchester, England, is equipped with electric lamps, air currents and a telephone to keep the firemen in communication with those outside.

Intercommunicating Circuits—TYLER.—*American Telephone Journal, July 15.*

The essential features of design for intercommunicating service are widely different from switchboard service. The requirements, in part, may be enumerated as follows: Each station must be able to connect with any other station without the means or aid of a third station, and must be able to ring the signal bell of the station thus connected with; centralized battery may be used for ringing, or for both ringing and talking energy; a station should be able to be called even when the instrument has been left in the position of communication with another station; when an instrument has been left in connection with the line to another station, the first-mentioned station should not have its signal bell rung by the attempt of some third station to signal the second-mentioned station, yet the third station should signal the second station without difficulty. Six diagrams are given, including an automatic-release diagram for the accomplishment of the last-mentioned requirement.

Hints for Installing Intercommunicating Apparatus—SMITH.—*American Telephone Journal, July 15.*

As the distance over which transmission is carried is usually short, good results may be obtained with common return or grounded circuit systems. Since it is requisite that each line run to every instrument, quite a mass of wires must be brought to each station and taken from station to station; if grounded return circuits are used, it is best not to use paired cable for the line circuits, as there would be too much induction between the two wires of a pair to permit them to be used for Independent lines. The best plan is to use No. 19 rubber wire with a covering of a color to match the woodwork along which it is to be run. Common annunciator wire is not recommended. The wires should be laced together to form a cable, and holes in walls or partitions where the cable passes through should be carefully made so as not to damage the wires.

Simultaneous Use of Circuits for Telephony and Telegraphy—FOWLE—*Telegraph Age, July 1.*

Extract from a paper read at the convention of the Railway Telegraph Superintendents at Chattanooga, Tennessee.

FINANCE AND ECONOMICS.

There is very great economy in such a plan. One terminal set of standard composite apparatus impairs transmission to the same extent as the introduction of approximately 1.25 miles of No. 19 B. & S. gauge cable or 35.6 miles of No. 8 B. W. G. open line. The effect of two terminal sets would be equal to 71.2 miles of No. 8 B. W. G. Therefore, it is advisable to composite only long trunk lines without intermediate telephone or telegraph stations. The costs of metallic circuits and of single-wire circuits, both copper and iron, are given, and comparisons made between compositing such circuits and building distinct circuits where pin space is available for the telegraph and telephone purposes. The question of economy may be summed up in the statement that the composite system is best adapted to circuits of moderate or great length, on which the telephone traffic and the telegraph traffic are of a through nature, or direct business between terminals. The simplex system of working is more flexible, and is better adapted than the former system for handling short-haul business, either telegraph or telephone. The Morse side of a composite system may be worked either single or duplex, and on the simplex system it may be worked single, duplex, diplex or quadruplex.

Bell Conditions at Frankfort, Indiana—Electrical World and Engineer, July 8.

The Bell company has purchased the local independent telephone exchange at Frankfort, Indiana. The Indianapolis Long-Distance Company, Independent, has a long-term

contract with the Frankfort Independent company, and proposes to enforce the terms of this contract with the new owners of the Frankfort company. The developments have a promise of interest.

Development of Telephony in Mexico—Electrical World and Engineer, July 15.

It is announced from Boston that the earnings of the telephone company operating in Mexico will be greater this year than for a year ago. The company is placing wires underground in a limited district in Mexico City, and a new common battery switchboard is being installed, with present equipment of 3,000 lines and an ultimate of 7,000. At Monterey a switchboard for 1,200 ultimate is being placed.

Telephony in Canada—Electrical World and Engineer, July 15.

Postmaster General Sir William Mulock, chairman of the telephone committee of the Dominion Parliament, will visit a number of cities and towns in Great Britain where municipal telephones are in use, and will report the result of his investigations upon his return.

Growth of the Telephone—Telegraph Age, July 16.

A review of the progress of the Bell company, particularly since the advent of competition in 1895, together with a statement of the present resources and income of the American Telephone and Telegraph Company.

Shortcomings of Intercommunicating Systems—American Telephone Journal, July 15.

Editorial comment upon the carelessness which so often causes the user of an intercommunicating system to condemn it. Poor workmanship in installation and maintenance is probably the most active cause of such dissatisfaction, and the consideration of price in purchasing equipment, leading to the selection of low-priced wares regardless of quality, is also largely responsible for the poor reputation borne by such systems.

Western Union Telegraph and the Telephones—Finance, July 15.

The probable relation of the telegraph and telephone companies after the expiration of existing contracts between the Western Union and the railroads is discussed.

Fixing Telephone Rates—Finance, July 15.

So many factors controlled by local conditions enter that it is impossible to fix a general standard of rates. In the telephone business, the more subscribers you get the less money you make unless you revise and raise the rates to meet the new conditions brought on by the development of the business. It costs more to furnish a telephone with facilities for connecting with 10,000 other telephones than for a small number of others. First cost of plant, operating, maintenance, general expense, taxes and depreciation are factors to be considered in fixing rates.

Against Government Telephony—Telegraph Age, July 1.

Mr. Herbert Laws Webb states that a government control of telephone service is a blight on the development of the service. This he gathers from investigations in Europe. Splendid service in Sweden is due to private enterprise.

Value of Telephone Securities—GREENSHIELDS.—*Telephony, July.*

National-Interstate Telephone convention paper. The principal public-service corporations may be divided into four classes, water, light, communication and transportation. In telephone companies, we find the best conditions for stability of income; the possibility of accidents in operation are negligible. One of the safest and most remunerative places for savings is in the first mortgage bonds of a conservative and well-managed telephone company.

New York Telephone Directory—Electrical Review, June 24.

The new New York directory contains 200,000 names, and the last issue filled twenty-one freight cars. The progress of the telephone business is indicated by this comment: "The accuracy, the convenience and compactness of this book, together with its broad circulation, cause it to be used almost to the exclusion of all other directories in New York city.'

Government Telephones Cheaper—Electricity July 5

A new contract has been made between the government and the telephone company giving service in Washington, by which a saving on the next fiscal year will amount to more than $17,000. The amount to be paid during the coming year is above $47,000. It is stated that the rate given the government in Washington "is the lowest telephone rate in existence in any large city in the United States."

Lectures on the Telephone as Advertising Means—Electricity, July 5.

Mr. Alonzo Burt, president of the Wisconsin Telephone Company, is preparing a series of lectures on the telephone, which he is arranging to deliver in cities where his company has exchanges, the object being to popularize the telephone and educate the public in its use.

Atlanta, Georgia, Telephone Conditions—Finance, July 8.

A rehearsal of the history of the Independent company at that place, from the business and traffic viewpoint. The Independent movement has not been successful, seemingly because of the lack of toll lines and country connections furnished by the competitor, the Bell company.

Keystone Telephone Company—Finance, July 8.

A statement of the conditions surrounding the Keystone Telephone Company, the Independent telephone company of Philadelphia, and its prospects; a recent bond issue indicates the effort for an extended business.

Federal Telephone Company—Finance, June 24.

Announcement of the dissolution of the Federal Telephone Company, a security holding company formed to promote Independent telephone enterprises in northern Ohio.

Cuyahoga Telephone Company—Finance, June 2..

All current numbers of Finance have much comment upon the flourishing condition of the Cuyahoga company, the Independent operating company of Cleveland, Ohio. Additional capital has been secured recently to promote the business, and dividends on the preferred stock are being paid and on the common stock are promised.

Plan of Handling Interchanged Toll Business—Western Telephone Journal, July.

A report submitted to the fourth annual meeting of the New York State Independents. Air line mileage between any two given stations should be used as a basis for determining tariff between the stations, the block system being adopted, the assumed distance between two stations being the distance between the centers of their respective blocks. Rates should be based on a minimum charge of six-tenths cent per air-line mile for a conversation of three minutes, with special rates to meet competition, with a minimum charge of ten cents for any message. Night rates should be half-rate except on rates less than 50 cents. The station originating an interchanged message should be paid a commission on the message whether sent paid or collect. After the commission for originating the message is paid, the remainder of the charge should be divided between the companies in proportion to the ratio of the air-line distances to the point of transfer, each toll line company assuming the mileage of its own connections. Each exchange or toll line company should make a report, not later than the tenth of the following month, to each other exchange or toll line company with which it is interchanging business. All business subject to frank to be accounted for and reported as if paid, and settlements to be made between companies for such business in their general settlements. Forms for use in accounting should be uniform for all companies.

TRAFFIC AND OPERATING.

Applications of the Theory of Probability to Telephone Traffic—RORTY.—*Telephony, July.*

Report of a paper read before the American Institute of Electrical Engineers. Mr. Rorty, who is an engineer in the Bell ranks, presented a series of curve sheets, showing the relations probable between the total number of calls occurring in a given period and the probable highest number

of calls occurring within any one proportionally smaller interval of that period. The application of these curves will frequently kill a false system in its inception and avoid much experimental work.

Telephone Operators' Mutual Aid—BROWN—*Telephony, July.*

Kansas City seems to be the first city to give attention to this feature of the telephone industry, a feature which is recognized in nearly every prominent industry of our country. Each member pays 50 cents per week and when ill receives $4 per week benefits; a physician is employed and is paid by the year, all members receiving his attention free of other charges at any time.

First Floating Telephone—Telephony, July.

In the great Salt Lake of Utah, 3,000 feet from shore, a telephone has been installed on a buoy. The depth of the water at that point is four feet. The telephone is connected to the private branch exchange of a hotel, and its primary object is the saving of lives of bathers. One may bathe and order dinner in advance.

Cuyahoga Party-Lines—Telephony, July.

The Cuyahoga Telephone Company, Cleveland, Ohio, is largely increasing its revenue without the installation of new wires or cables by changing many of its patrons to two-party or four-party lines, and at the same time is raising its rates for individual line service, the party-line service offering an alternative for those patrons who do not desire to pay the increased rental for single-line service.

Telephone Traffic—MCMEEN.—*Telephony, July.*

In a telephone sense, traffic is the gross total of the individual conversations between telephone users; this traffic may be expressed as to amount in whatever terms are found convenient for the particular phase to be considered. For local service, the conversation is the unit. It is important in all sizes of offices to determine from time to time the amount of traffic which is being satisfied by the lines and equipment. No central office equipment can be intelligently installed without a determination beforehand of the probable traffic and of the required equipment to handle that traffic efficiently. If data from the particular town involved may not be obtained, data from another town of similar size and conditions may be taken as reliable. The methods and equipment for handling the traffic are to be determined after the nature and quantity of the traffic is determined with sufficient accuracy.

Telephones on Union Pacific Railway—Electricity, June 21.

The Union Pacific railway is to operate over all its lines a telephone service for the operation of trains. It will not supplant the telegraph, but will be supplementary. Trains will carry portable telephones which may be attached to the wires for use in case of accident.

Toll Line Clearing House—Electricity, June 21.

The Iowa Toll Line Telephone Company has decided to incorporate a clearing-house company with a capital stock of $10,000. The clearing-house will be located in Des Moines and will make out the regular reports for the companies, saving each one the trouble of making out its own reports, as well as reports for companies doing business over its line as well as for the companies over whose lines it does business.

London to Rome—Western Electrician, July 15.

The general postoffice of Great Britain for some time has been endeavoring to hold direct conversation with the head Italian office at Rome. A connection was effected, and officials in London conversed with officials at Rome, across the Dover Straits and half the continent. London is already in communication with Paris and Paris with Rome via Turin, and a junction of the two lines was effected to carry out the experiment. An official of the general postoffice has given information that the conversation with Rome was carried on under the greatest difficulties, and he could hold out no hope that the general subscriber ever would be able to talk to his friends in Italy. The submarine portion of the line is considered to be the chief cause of the lack of success of the experiment.

Centuries of Time—Finance, July 15.

During the last few years the Bell companies have reduced the delay in answering calls about four seconds. Finance multiples the four seconds by the total number of calls, and shows that the resultant economy of time to telephone users amounts to some 455 years per annum.

Telephones on Long Island Railroad—Electrical World and Engineer, June 24.

It is announced that the Long Island railroad is completing, in connection with the electrification of its western lines, a very thorough private telephone system, so that the electrical superintendent at Long Island City can keep thoroughly in touch with all portions of the system. Telephones will be scattered along the fifty miles of track, no two being more than 2,000 feet apart.

Credit Relations With Subscribers—American Telephone Journal, June 17.

A discussion of desirable routine in the collection department of a telephone company, with suggested forms.

National-Interstate Association Standard Operating Rules—American Telephone Journal July 1.

The complete rules, compiled by a committee and adopted as a standard by the National Interstate Telephone Association. The reprint requires twelve pages of the Journal, and the nature of the rules is such that they should be read in full, rather than through a digest.

Arguments for Intercommunicating Business—EMERSON.—*American Telephone Journal, July 15.*

This is a letter of instructions to prospective canvassers for local intercommunicating systems and outlines the arguments in favor of such systems in general, all of which should be at the command of the telephone man seeking this class of business.

Cuyahoga Telephone Bicycles—American Telephone Journal, July. 8.

The Cuyahoga Telephone Company has equipped its repair men with bicycles, and is pleased with the results achieved.

Maintenance of Underground Structures—HUMISTON.—*Telephony, July.*

LINES AND CONSTRUCTION.

In underground telephone systems, the distribution of telephone conductors to the subscriber's premises falls into three classes: First, large buildings where a number of conductors are taken to the building and the distribution cared for by the wiring of the building; second, situations where the first class of construction is impossible, yet where aerial wire may not be used; third, where an underground conduit leads to the middle of a block and aerial circuits radiate to the subscribers' telephones. The first class may require a terminal to be moved as a matter of maintenance because care was not used in locating it originally; the second class requires terminals of some nature in the underground vaults, the maintenance of which must be considered, as well as the convenience of running new circuits and changing old circuits; the third class is not discussed. An important phase of maintaining an underground plant in a large city is the possible changing from one central operating point to several interconnected operating points. Long conduit sections show lower maintenance cost than would be shown for a similar length of cable in shorter conduit sections, because of fewer vaults and therefore fewer points for trouble; lower fixed expense on account of the decrease of first cost; greater simplicity of records. This is true even when bends in the conduit between manholes are necessitated, as experience has shown that cables are easily pulled through such bends without injury. Where it becomes necessary to extend conduit along structures such as viaducts and bridges, the iron pipe used should be accessible for painting and repairs and expansion joints should be provided; where they are subjected to the corroding action of locomotive gases they should be afforded ample protection. Some experiments in drawing cable

through ducts, both unlubricated and lubricated with soapstone, are recited, and the conclusion is drawn that it is best to draw in a cable at the highest speed consistent with safety from accident.

Bell Long-Distance System—Finance, July 15

A gap of only 170 miles now exists between the Bell long-distance system of the Pacific coast and the similar system of the eastern and central United States; however, even if that gap were bridged over it would not be practicable to talk so far as across the continent until improvements in instruments are made to permit it.

Underground Toll Line Circuits—American Telephone Journal, June 17.

To obtain an underground circuit of low capacity, adapted for telephonic use even when of great length, the expedient has been adopted of drawing into the usual type of duct a group of rubber-covered wires held apart by insulating blocks spaced at desirable distances; the conductors pass through holes in these insulating blocks and alternate in the holes as upon pins, thus securing transposition effects. The method has been subjected to tests of several years, and has shown gratifying results.

Multiple Cable Distribution—American Telephone Journal, July 1.

Editorial discussion of the general plans of multiplying the outer terminals of a cable distributing telephone circuits to subscribers. The conclusion seems to be, "Multiple construction is a good thing, but don't work it to death."

River Crossings—PUTNAM.—*American Telephone Journal, July 8.*

The Enfield division of the Southern New England Telephone Company lies on both sides of the Connecticut river. At Enfield Bridge, Connecticut, the bridge was torn down, and the telephone company erected a suspension device to carry telephone cables across the river. The towers are of wood, forty-five feet high on the west bank and thirty-three feet high on the east. Each is designed to bear a pressure of our four tons. The span is 855 feet long. Two one-inch Roebling steel suspension bridge cables support cross joists of wood, which thus form a bridge on which the telephone cables are laid. Another river crossing is north of Gildersleeve and Middletown, Connecticut, where the American Telephone and Telegraph Company has erected two tall iron towers to carry its conductors; the river is navigable and the towers are high; on the east bank the tower is 186 feet high, while on the west bank the tower stands on a bluff and is 86 feet high; the towers are of tubular steel. The length of the span is slightly over 1,200 feet, and the sag is 40 feet; the wire is No. 8 steel. The article is illustrated with pictures of both crossings.

Twisted Pair Distribution—PRICE.—*American Telephone Journal, June 24.*

A problem which confronts telephone managers is a method of reaching subscribers from aerial terminals. Bare wires will get crossed, and they attract lightning discharges, and in case they break and fall across high potential circuits, damage will ensue. These objections have led to a two-conductor insulated twist. No. 14 is a favored gauge for the conductors, and the insulation is first rubber and then a heavy saturated weatherproof braid, the braid frequently being indexed, or different for the two wires, to identify them at the ends. Methods of placing the twisted pair are discussed with illustrations.

Railroad Telephone Circuit Design—Telegraph Age, July 16.

From a paper read by Frank F. Fowle, at the Chattanooga convention of Railway Telegraph Superintendents. The design of circuits to meet a particular condition is a problem which may be solved with precision, but it is essentially a traffic problem.

Postmaster David A. Robinson of Dallas, Texas, has received authority from the postoffice department at Washington to install an interior telephone service in the postoffice in that city.

MOODY'S MANUAL FOR 1905.

Moody's Manual of Railroads and Corporation Securities. Revised edition. Size, 7x9 inches; 2,600 pages; map illustrations. Price—express charges prepaid in United States, Canada and Mexico—$12 for full Russian leather; $10 for red cloth. Published by Moody Publishing Company, 35 Nassau street, New York. Subscription department, 535 The Rookery, Chicago, Illinois.

The new edition of Moody's Manual of Railroads and Corporation Securities is so comprehensive and complete that the claim made by the publishers that the book is superior in every department to that of any publication in the country, is a statement that cannot well be repudiated. This year's edition contains over 3,000,000 words and covers the entire field of corporation investments. There are ten sections to the volume, and each section has been prepared by its own special experts, who have made it their entire work to make the book complete and up-to-date in every possible sense of the word.

Moody's Manual has increased 80 per cent in matter of contents over the first edition, which was published six years ago; in point of size it has increased over the first edition 100 per cent; in circulation 400 per cent. The 1905 edition shows an increase of 80 per cent in steam railway information over the 1904 edition; in increase of 56 per cent in electric traction information; 49 per cent in gas and electric light company information; 80 per cent in water supply company information; 32 per cent in telephone, telegraph and cable company information; 21 per cent in industrial information; 48 per cent in mines; 90 per cent in banks and other financial institutions. The growth in the size of the page over the 1904 edition is 30 per cent; growth in size of volume, 35 per cent; growth in edition printed, 45 per cent; increase in price, nothing!

To-day the Manual is the most accurate and complete steam railway book in existence, and the only electric traction book that endeavors to cover the field in a comprehensive way; it is the only reference book containing sections on gas, electric light, water supply, telegraph and telephone companies; it is the only book containing a section on industrial corporations that is in anv sense uniform and complete, and it is the only investment manual containing reports on mines and oil corporations. Furthermore, it is the only book in the United States which contains anything like a complete statement of banking and other financial institutions.

The book now circulates all over the world and will be found in the leading banking institutions and in the hands of investors as far away as South Africa, Australia and Japan. Its European circulation is increasing with remarkable rapidity, and throughout the United States the book is looked upon as the standard of its class by all progressive bankers, brokers and men of affairs. Its circulation in the Wall street district is probably double that of any of the other railroad or investment manuals. This large circulation is due to several causes, the chief one being that the book is not confined to one or two particular lines, like steam or electric railroad statistics, but covers all fields of interest to the dealer or investor in securities, and does this with even more accuracy, comprehensiveness and enterprise than those books which make a specialty of a particular line and merely skim over or entirely ignore equally important fields of investment. The growth and development of Moody's Manual during the past few years is enabling the financial community to do away with these old inconveniences. The book is becoming more and more to be looked upon as being as necessary a feature in the average banking or brokerage office as is the ticker or the telephone.

It is conservatively estimated that there are more than three million Independent telephones in service.

International Electrical Exhibition

M. C. BARRY

THE International Electrical Exhibition, held in Boston the week of July 15 to 22, was a complete success in every particular, the electrical interests of the United States being represented on this occasion by a very large number of delegates and visitors, as well as by elaborate displays, numbering nearly a hundred. The exhibition was held under the auspices of the National Electrical Contractors' Association of the United States and the Massachusetts Electrical Contractors' Association. That the exhibition was all that the promoters had hoped it would be was evident from the moment the doors were thrown open. It is estimated that between 25,000 and 30,000 people—an interested and enthusiastic throng—passed through the gates the opening night, packing Mechanics' Hall as it had never before been packed. The exhibits covered a space of 75,000 square feet.

In connection with the exhibition the annual convention of the National Contractors' Association was held on Wednesday, Thursday and Friday, July 19, 20 and 21. Its proceedings took place in the most commodious of the several auxiliary halls above the exhibition floor.

A feature of the initial session of the convention on Wednesday was the open session. At 10 o'clock the address of welcome to the members and guests was made by F. L. Barnes, president of the Massachusetts Electrical Contractors' Association. The address of welcome on behalf of the state was made by Governor W. S. Douglass. The address welcoming the delegates and visitors to the city was made by Mayor P. A. Collins, to which Ernest McCleary, president of the National Electrical Contractors' Association, responded.

Charles L. Eidlitz of New York city delivered an address, entitled, "The Electrial Contractor." The following addresses also were made: "The Jobber and the Manufacturer," A. L. Gorman, general manager of the Manhattan Electrical Supply Company, New York city; "The Underwriter," F. E. Cabot, Boston; "The Relations of Inspector and Contractor," J. P. Kennedy, commissioner of wires, Boston.

An executive session of the association was held on Wednesday afternoon, and at 6 p. m. the annual dinner—an elaborate affair—was given to the members of the association.

Thursday morning was given up to a business session. On Thursday afternoon there was a sail down the bay to Paragon Park, where a most enjoyable time was had.

Friday morning and afternoon were devoted to business sessions.

A ladies' committee of thirty had charge of the entertainment of the lady guests of the association. Concord, Lexington, Bunker Hill, Harvard College and other historic and interesting places were visited and an extended auto trip was taken along the picturesque north shore. Side trips for sightseeing and shopping were also made daily by the fair visitors.

Pingree's Boston band rendered daily musical concerts and every effort was made to make the occasion a most happy and interesting one.

The immense hall where the convention was held was beautifully decorated with bunting and flags, and these, along with palms and potted plants interspersed in every direction with incandescent, Nernst and Cooper-Hewitt lamps, made it a scene at once bewildering and entrancing. Through the courtesy of the American Mutoscope and Biograph Company and the Westinghouse Electric and Manufacturing Company six performances each day were given of a trip through the Westinghouse works. These views were highly interesting, and a number of them were decidedly humorous. The attendance at each of these shows taxed the exhibition space to its utmost.

There were a number of decidedly novel exhibits—the joint display of the Perkins Electric Switch Manufacturing Company and the Bryant Electric Company, the General Electric Company's exhibit, the remarkable display of the American Circular Loom Company, the Westinghouse exhibit occupying all of the large platform space, and the pergola of the John A. Roebling's Sons Company, all exciting commendation from the visitors.

The high-frequency apparatus of the Ovington Manufacturing Company proved a great drawing card. Earle L. Ovington personally demonstrated some of the most recent marvels in spectacular experiments with transmission of electricity through the human body. There were demonstrations with the giant X-ray machine, exhibited by the Heinze Electric Company. The electrical heating and cooking apparatus shown by the Simplex Electrical Company and the Prometheus Electric Company, and the high-frequency sign of the Westinghouse Electric and Manufacturing Company also attracted a great deal of attention. C. S. Knowles had secured the mammoth 200,000-volt transformer—the largest in existence—built at the Worcester Polytechnic Institute, and with this apparatus were given some remarkable displays.

Another notable feature was a working model of a wireless electric-railway system. There was a working model also of an electric announcer of next stations and stopping places, shown in car interiors as they approached and reach successive stations on the line.

While a number of exhibitors were distinctly local to Boston and its environs, there were so many manufacturers from states other than Massachusetts that the show was truly national in its representation. Aside from the regular line of electrical apparatus of every description, the spectacular features enumerated above added greatly to the enjoyment of the hosts present.

Some of the most important figures in the electrical trade were in attendance at this gathering of the electrical contractors. The association numbers in the aggregate about 650 members, representing a total capitalization of more than $25,000,000, and delegates from forty states in the Union were present.

John P. Coghlin of Worcester, first vice-president of the Massachusetts association, was chairman of the special committee of arrangements, and Frank L. Barnes of Boston, president of the state organization, was treasurer. A. T. Sampson of Lynn was secretary, and there were two other members, T. T. Kelly of Boston and F. A. Richardson of Worcester.

The manager of the exposition was Chester I. Campbell of Boston, who did great preparatory work for the success of the event.

Other committees were as follows:

Reception—F. L. Barnes, chairman; F. A. Swan, P. S. Deane, G. E. Brigham, H. D. Temple, H. F. Sawyer, R. H. Hallowell, P. A. Coghlin, P. V. Latour.

Printing and Advertising—H. A. Holder, chairman; J. Wilkinson, W. E. Clark, G. E. Brigham, T. W. Byrne.

Entertainment—S. G. Wetherbee, chairman; F. W. Lord, F. A. Richardson, H. D. Temple, A. H. Andrews, T. T. Kelly, F. Bryant, M. M. Jacobs, E. C. Lewis, T. P. Curtis, I. L. Mattson, D. H. Fisher, H. S. Potter, H. M. Lobdell, J. A. Cole.

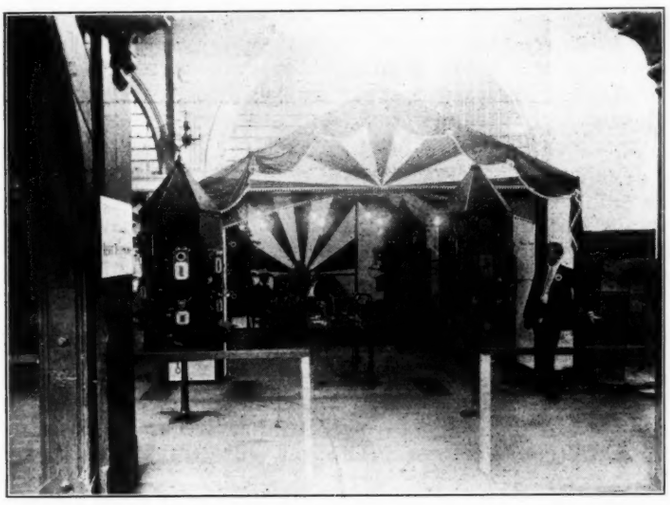
The local committee deserves great credit for bringing its plans to so successful a culmination.

Among the exhibitors who are known to the telephone

ELECTRIC GAS LIGHTING COMPANY'S EXHIBIT.

trade and whose product is used for different purposes in the telephone field were the following:

S. H. Couch Company, Boston; Couch & Seeley, Boston; General Electric Company, Schenectady, New York; Appleton Electric Company, Bridgeport, Connecticut; Bryant Electric Company, Bridgeport, Connecticut; Chase-Shawmut Company, Boston; S. B. Condit, Jr., Electrical Company, Boston; De Veau Telephone Company, New York; Delaware Hard Fibre Company, Wilmington, Delaware; Electric Gaslight Company, Boston; Eastern Carbon Works, Jersey City; Eastern Electric Cable and Wire Company, Boston; Gould Storage Battery Company,



S. H. COUCH COMPANY'S EXHIBIT.

Boston; C. S. Knowles, Boston; Manhattan Electrical Supply Company, New York and Chicago; Miller Anchor Company, Norwalk, Ohio; National Carbon Company, Cleveland, Ohio; Pettingill-Andrews Company, Boston; John A. Roebling Sons Company, New York; Sprague Electric Company, New York; Stuart Howland Company, Boston; Holtzer-Cabot Company, Brookline, Massachusetts.

The exhibit of the Electric Gas Lighting Company of Boston was one of the most elaborate and complete in the hall. It was in charge of Messrs. H. C. Thompson, manager, W. F. Abely, G. W. Goodrow, F. A. Ross, A. F. Boardman, C. A. Howes, F. H. Sherman, C. S. Norris, C. E. Lee, C. A. Young, J. Allen Haines, Chicago representative and C. H. Bongard, Canadian representative. The company exhibited its No. 3 Samson battery, which it claims is replacing storage batteries in switchboard work; its Rotokoll switchboard for small installations, such as factories, hotels, etc.; its Evershure automatic telephone, for small installations, which is a combined telephone and switchboard; its push button automatic reset intercommunicating telephones; new distributing box; marine telephone equipment; annunciaphone for hotels, and a full line of telephone equipment supplies and apparatus.

The S. H. Couch Company of Boston had a fine exhibit which was in charge of S. H. Couch, Will Couch, C. E. Monroe and the company's staff of salesmen. The principal features of the exhibit were the company's new bridging and toll line equipment, both telephone and switchboard, the Couch automatic reset switchless intercommunicating telephone, the company's apartment house telephones and desk instruments, and a complete line of telephone apparatus. The booth was well equipped and decorated and the exhibit was one of the finest made.

PURDUE'S TELEPHONE ENGINEERING DEPARTMENT.

The success of the department of telephone engineering at Purdue University, Lafayette, Indiana, in charge of Prof. M. B. Huntoon, has caused, it is said, the Ohio State University and the schools of technology of the east to think seriously of opening similar departments soon. Applications have been received at Purdue by men who want to take the two-year course in telephony, but this is refused them because the department would become crowded with special students. The study is only a part of the course of electrical engineering. Juniors and seniors may take telephony in preference to steam engine and boiler work. There are now twenty-five in Professor Kelsey's class, and the prospects are for a much larger class next year. There is a growing demand for Purdue students as experts to take charge of telephone lines and exchanges.

TELEPHONES ON TARGET RANGE.

The work of installing a complete telephone system at the national target range, two miles north of Junction City, Kansas, on the Fort Riley reservation, has been completed. Each firing point at the range is connected underground with the butts, where eight telephones will be in operation during the firing. These connections are so distributed that there are two for each set of seven targets, one in front and one in the rear. This system is to be connected with the Fort Riley system, so that it will be possible to talk from any telephone at the firing points with the post or city. Civilian organizations of marksmen of the west will probably get to use the target range for their events this year and the years following.

The Pittsburg woman who set about to prevent the Bell telephone company from erecting poles on her premises is a female of resources, says a Pittsburg paper. As fast as the workmen dug the holes she plugged them up with her own offspring. Nora plugged the first hole, Bridget the next one, Pat the third, Mike the fourth and Jimmy the fifth. The dispatch does not say whether any more holes were dug or whether the lady ran short of plugs, nor did it give the result of the conflict.

In the Financial Field

SALE OF CUYAHOGA TELEPHONE SECURITIES.

IN order to raise money for the financing of the various improvements of the Cuyahoga Telephone Company of Cleveland, a deal was closed a few days ago for the sale of $428,000 of the bonds of the Cuyahoga Telephone Company and over $350,000 of common stock, to a Toledo syndicate composed of J. K. Secor, Willard Robinson, J. S. Brailey and H. R. Ashbrook. The exact figure at which these securities were sold is not given out. A lump sum was paid for the securities.

The bonds sold were treasury bonds of the Cuyahoga Telephone Company, of which $128,000 are in the treasury and $300,000 will be issued at once. This will raise the outstanding bonded debt of the Cuyahoga Telephone Company from $2,400,000 to $2,700,000. The Cuyahoga has no common stock in its treasury and the stock sold will come from the Federal Telephone treasury and from the various members of the Everett-Moore syndicate. The Cuyahoga in order to deliver the stock to the Toledo syndicate, will purchase it direct from the Federal Telephone treasury, and from the various members of the Everett-Moore syndicate.

This deal will give the Cuyahoga sufficient money to pay for the immense amount of improvements which have been made during the last year, in the way of installing its new telephones, and will pay indebtedness due for the switchboard which was contracted for some eighteen months ago. The Toledo syndicate believes that the bonds are worth more than 90 and that the stock is worth better than 30 at the present time. The company is showing up splendidly and Colonel Dickson, its president, is quite confident that the common stock will go on a 4 or 6 per cent dividend basis early next year.

For some months Colonel Dickson has been negotiating with Cleveland bankers to secure loans for the purpose of cleaning up the entire floating debt incurred as a result of the extensive improvements and developments of the Cuyahoga. He called a meeting of Cleveland bankers several months ago and it was proposed at that time to borrow the money on certain bonds, preferred and common stock. It is understood that in about ten days or two weeks Cleveland bankers notified Colonel Dickson that they would advance the money, provided they were given an option on the bonds. Colonel Dickson declined the offer, considering the price ridiculously low. He then opened up negotiations with the Toledo syndicate for the sale of the bonds and common stock and the result is known.

The Toledo syndicate, which purchased the Cuyahoga bonds and stock, had little difficulty in disposing of the entire lot, the purchase causing an immediate jump of ten points in the price of the stock. The syndicate opened subscriptions on the Monday following the sale at Toledo, and by Tuesday night the issue was largely oversubscribed. There is absolutely no doubt but that the securities are of genuine intrinsic value and that they have been selling in Cleveland at very much below their real value. Toledo people are very friendly to telephone securities, and for this reason the large block was quickly disposed of in that city. The only reason that they have sold low in Cleveland was on account of the local conditions prevailing there. That they will sell at much higher prices is admitted on all sides.

The progress of the Cuyahoga Telephone Company during the past year has been nothing short of phenomenal, and was much greater even than was anticipated by the officials of the company. In his annual report for 1904, President Dickson said:

"Of the increase of telephones installed within the year 1904, the largest increase was in the month of December (659), indicating that we are yet far from reaching the limits of our development. In January, 1905, our good record has been maintained; the net increase of telephones for that period being 651. The increase in annual receipts from the additional telephones installed in 1904 amounts to $106,401.50, while the increase in annual receipts from those installed in January, 1905, amounts to $13,396.75. The anticipated additional increase is not founded upon mere guesswork, but upon known conditions and upon well-formed and carefully matured plans, and I am inclined to believe that the average increase will exceed 500 per month, instead of falling below that."

The predictions of Colonel Dickson have been exceeded in every instance. He estimated an increase of 500 telephones for each month, and the actual record thus far compiled is as follows:

Number of subscribers on December 31, 1904, 14,370. New subscribers, January, 1905, 651; February, 454; March, 494; April, 532; May, 626; June, 612. This brought the total list of subscribers on July 1 up to nearly 18,000.

It is estimated that Cuyahoga Telephone will earn 6 per cent on the preferred stock this year, and at least 6 per cent on the common.

The increase in the gross earnings of the Cuyahoga for the first five months of 1905 are, by months, as follows: January, $9,715; February, $10,624; March, $11,694; April, $12,837; May, $12,538; total, $57,408. The increases for the remaining months of the year will doubtless be larger than for the first five months, and it would not be surprising if they would average $13,000 a month, or $91,000 for the seven remaining months of the year. This would make an increase in gross earnings for the year 1905 of about $150,000. These figures will probably be exceeded, as the Cuyahoga has shown that it has grown faster than its directors and officers have anticipated.

The operating expenses will not grow in the same proportion as the increase in gross, and therefore the showing in the surplus gains would be much greater than the showing in gross earning gains. Operating officials of the Cuyahoga Telephone Company report that there is no let-up in the demand for telephones and that they are quite confident that the total number of telephones in service of the Cuyahoga Telephone Company by January 1, 1906, will exceed 21,000.

The stockholders of the Cuyahoga Company at a recent special meeting voted to increase the number of directors from twelve to fifteen. The new directors chosen were as follows: J. K. Secor, James S. Brailey, W. F. Robinson. The election of these directors was in compliance with the agreement for allowing them representation on the board as promised when the Toledo syndicate purchased one-third of the capital stock of the company and $428,000 of the bonds.

* * *

BIG DEAL IN KEYSTONE TELEPHONE COMPANY BONDS.

Fisk & Robinson of New York are the head of a syndicate of New York and Boston bankers who recently have

underwritten an issue of $4,000,000 5 per cent 40-year coupon, or registered, bonds of the Keystone Telephone Company of Philadelphia. The bonds were issued for the purpose of retiring the company's floating indebtedness and to provide funds for development work. This issue is the first lot of bonds which has been put up and constitutes a first lien on the property of the company. The company has a perpetual franchise and has outstanding $6,000,000 common stock and about $2,000,000 6 per cent cumulative preferred stock. The bonds will be sold largely in Philadelphia and New York. Such bonds as are to be sold in Boston will not be offered to investors until some time in the early part of July.

It is reported that the Keystone company is now earning on a basis of $800,000 gross and $420,000 net per annum, as against $685,740 gross and $325,438 net in 1904. The net earnings for the first quarter of 1905 were $100,432, and the estimate for the second quarter ending June 30 being at fully $110,000, over $210,000 will be shown for the six months.

* * *

SYNDICATE PURCHASES SUBURBAN TELEPHONE COMPANY.

The Suburban Telephone Company, recently organized, and operating from Clayton, St. Louis county, Missouri, has been purchased by a syndicate formed by the Mississippi Valley Trust Company, through a deal closed by James D. Houseman, the original promoter of the company, and a large stockholder. The syndicate includes several of the large stockholders of the Kinloch Telephone Company and several of the Suburban company. Plans are made to increase the capital stock from $100,000 to $500,000, and the system which operates around Clayton will extend its lines to take in the whole county. New equipment will be added to the plant, and improvements will be made in all departments. The concern will be reorganized and conducted as a strictly Independent company.

* * *

ROCHESTER CAPITALISTS BUY SYRACUSE PLANT.

Rochester capitalists, headed by G. R. Fuller, manager and treasurer of the Rochester Telephone Company and a director in the Independent Securities Company, have acquired the property of the Syracuse Telephone Company. The entire plant of the Syracuse Telephone Company and the Columbia Long-Distance Telephone Company will be taken over by the Independent Telephone Securities Company. The Rochester Telephone Company recently acquired a controlling interest in the Securities company, so that the two companies are to all intents and purposes identical. The new owners of the local company will sell $1,000,000 of the bonds of the Independent company, giving the usual inducement of 40 per cent of common stock in the Syracuse company as a bonus.

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TELEPHONE BONDS IN DEMAND.

Regarding the sales of bonds and stock in certain well known telephone properties, Finance says: "Cuyahoga Telephone has been in demand, selling at 14¼, with 15 and 15¼, buyer thirty days. The renewal in the activity of this stock is undoubtedly due to the splendid showing the Cuyahoga made during the month of May, and the fact that negotiations have been completed for the financing of the floating indebtedness of the company. This common stock is unquestionably earning from 5 to 6 per cent at the present time and should pay dividends some time next year. * * * Springfield & Xenia Telephone stock registered a slight advance during the week, selling at 25½, and closing at 25½ to 26. The bonds sold on curb at 74, steady at price quoted. They closed on the Exchange at 73½ bid, and 75 asked. We believe they should sell higher. * * * Louisville Home Telephone bonds and stock have been stronger also, the stock being bid for at 59 and offered at 61, and the bonds at 91½ to 92½, sales at 91¾. The last previous sale of the bonds made on our Exchange was at 84. Of course, there have been numerous sales in them on curb, so the advance is nothing out of the ordinary. * * * Toledo Home Telephone bonds have been steady around 94, closing at 93¾ bid, 95 asked. There are being steadily absorbed and should sell even higher. * * * United States Telephone bonds came into the market again this week, selling at 80, while the Cuyahoga 5s sold at 78½. It is understood that the Cuyahoga Telephone Company will make an effort to create a market for these bonds in Cleveland, and they are predicting much higher prices for both issues."

* * *

DIVIDENDS DECLARED.

Beloit (Wis.) Telephone Company, annual, 4 per cent.

Edinburg (Ind.) Telephone Company, annual, 6 per cent.

Lynn (Ind.) Telephone Company, annual, 23 per cent.

Home Telephone Company, Toledo, Ohio, quarterly, 1 per cent.

Tazewell County Telephone Company, Fremont, Illinois, annual, 6 per cent.

Columbia Telephone Company, Hudson, New York, quarterly, 1¼ per cent.

Cuyahoga Telephone Company, Cleveland, Ohio, 9 per cent, preferred stock.

New Long-Distance Telephone Company, Indianapolis, quarterly, 1 per cent.

Jackson County Telephone Company, Newport, Arkansas, annual, 11 per cent.

Nicollet County Telephone Company, St. Peter, Minnesota, annual, 8 per cent.

Manitowoc & Western Telephone Company, Cato, Wisconsin, annual, 25 per cent.

Menominee Range Teephone Company, Menominee, Michigan, annual, 7 per cent.

Northern Illinois Telephone Company, Sandwich, Illinois, semi-annual, 3½ per cent.

Tri-State Telephone and Telegraph Company, Minneapolis, Minnesota, quarterly, 1½ per cent.

Columbus (Ohio) Citizens' Telephone Company, quarterly, 1 per cent on common stock of $750,000.

Citizens' Telephone Company, Columbus, Ohio; quarterly, 1 per cent on $750,000 of common stock.

* * *

BRIEF FINANCIAL NOTES.

The Bradshaw (Neb.) Telephone Company has increased its capital stock to $50,000.

The Lawnridge (Ill.) Telephone Company has increased its capital stock from $3,500 to $21,000.

The Burlington & Augusta (Iowa) Telephone Company has increased its capital stock to $25,000.

The Bluefield (West Virginia) Telephone Company has increased its capital stock from $30,000 to $50,000.

The Home Telephone Company of Joplin, Missouri, has increased its capital stock from $200,000 to $750,000.

The Independent Telephone Company, of Atchison, Kansas, has increased its capital stock from $25,000 to $150,000.

The Falls City (Neb.) Telephone Company has amended its articles of incorporation increasing its capital stock to $50,000.

The Farmington Valley Telephone Company of Collinsville, Connecticut, has increased its capital stock from $27,000 to $54,000.

The Columbia Telephone Company of Columbia, Missouri, has increased its capital stock from $5,000 to $250,000; assets, $125,000; liabilities, $120,000.

The Mayne-Monroe Telephone Company of Lyons, New York, has increased its capital stock from $100,000 to

$200,000, in order that extensions can be made and new exchanges installed.

The fifth annual statement of the Philo-Fairland Telephone Company of Philo, Illinois, shows receipts of $2,866.86, and expenditures of $3,164.39. The company has 167 telephones in service.

The Mutual Telephone Company of Des Moines, Iowa, has filed a mortgage to the Equitable Life Insurance Company of Iowa, to secure a loan of $100,000 and cover an indebtedness of $3,000. J. S. Bellamy of Knoxville is president of the company.

The board of directors of the York State Telephone Company of Elmira, New York, have just completed a plan by which the capital stock of the company is to be reduced 50 per cent, from $2,500,000 to $1,250,000. It is thought this reduction will be to the advantage of the corporation.

The Indianapolis Commercial-Reporter of a recent date says: "The bid on New Telephone bonds yesterday showed renewed strength and advanced to the high mark of $970, with none offered at less than $990 each. The demand for these bonds is apparent, but they are firmly held."

At a recent meeting of the board of directors of the Toledo Home Telephone Company a voting trust was organized to remain in existence until 1910. The purpose of the trust, which will contain 70 per cent of the stock, is to keep the local Independent plant from falling into outside hands or into the control of unfriendly interests. The trust is composed largely of the directors of the company.

The directors of the Home Telephone Company of Kansas City, Missouri, have declared a quarterly dividend of 1¼ per cent, payable July 15, on the stock of the company. The officials declare that the company is earning enough to justify the payment of dividends at the rate of 5 per cent annually. The bid price was advanced three points to 75. No sales were reported in Kansas City, but there was some trading in St. Louis.

The Citizen's Stamford Telephone Company of Middleton, New York, has given a mortgage of $200,000 upon its franchises and property to the Knickerbocker Trust Company of New York city to secure the payment of bonds, which are to be issued by the company to improve and extend its lines. The bonds are to be payable in 1935, and will be 5 per cent gold bonds. One hundred bonds will be of $500 each and 150 of $1,000 each.

The Lincoln (Neb.) Telephone Company has paid its $500 occupation tax for the year ending April 1, 1906, and has also paid the 1 per cent tax earnings, amounting to $463.52. The latter is 1 per cent of the gross earnings of the company, which were reported to be $46,351.75. The franchise provides that the company shall pay 1 per cent annually of its gross receipts for the first five years, 2 per cent for the second five, and 3 per cent thereafter.

At a recent meeting of the stockholders of the Redwood county (Minn.) Rural Telephone Company the directors were given the right to issue $8,000 worth of preferred stock, drawing 7 per cent annual interest, the stock subject to retirement within three years. The company practically controls all the rural lines in Redwood county, together with various exchanges in Redwood and Yellow Medicine counties, and the management had in view the acquiring of the Redwood Falls exchange.

A special meeting of the stockholders of the Home Telephone & Telegraph Company of Los Angeles, California, has been called for August 29 to consider the question of increasing the capital stock of the company from $3,000,000 to $6,000,000. The Home company, which, according to report, is to extend its operations to San Francisco and Oakland, has issued its annual report, in which it is set forth that the surplus after paying operating expenses, interest on bonds and dividends for 1904 is $50,603.27. During this time dividends amounting to over $75,000 were paid on the stock of the corporation.

The Tri-State Telephone Company of Minneapolis has just distributed its eighth quarterly dividend among its stockholders, the dividend being an a basis of 6 per cent a year. The company is this year building a thousand miles of new long-distance lines. The new lines reach Ortonville, Redwood Falls, New Ulm, Sleepy Eye and Springfield. There will also be new lines from Winona to Mankato and from La Crosse to Albert Lea. Lines will be built out of Grand Forks. Exchanges are being built at Faribault and Litchfield.

The Central Dakota Telephone Company of Aberdeen, South Dakota, through its president, J. L. W. Zeitlow, and its secretary, W. G. Bickelhaupt, has filed in the office of the register of deeds of Brown county a mortgage to John C. Bassett, trustee, for $500,000. This amount is to be spent by the company for the purchase of new lines and the extension and improvement of the lines now owned and operated by the company. The money is to be raised by the sale of bonds. During the past year the company spent $475,000 in improvements.

TRIAL BY TELEPHONE; EVERYBODY SATISFIED.

"The telephone has proved a wonderful economizer of time," says a prominent citizen in the Little Rock (Ark.) Gazette, "and various are the uses it has been put to quite outside of business and social conversation. It has been used to perform long-distance marriage ceremonies and it has served to trap many a bogus check passer, forger and swindler, but it has remained for Pulaski county to introduce the trial by telephone. It came about in this way:

"A deputy sheriff is now kept at Forest Park. A few days ago he arrested a negro for some misdemeanor and was for bringing him to town to be tried before a magistrate. That meant a loss of a couple of hours' time at the least, and probably longer, so when the prisoner suggested a rapid-fire settlement he was willing. The negro said, 'See here, boss, Ah knows Ah is guilty, an' you knows it, too, 'cos yo sho cotch me dead ter rights. Ah hain't a hankerin' arter no trial—hav ter pay er lawyer an' git it in der neck anyhow. Kain't Ah plead guilty an' pay mah fine now? Hain't got no time, nohow, goin' erround dese yer jestice cotes.'

"Deputy Sheriff Clifton conceived an idea. He telephoned a magistrate, explained the nature of the offense, and asked the amount of the fine and costs on a plea of guilty. He collected the amount on the spot and turned the negro loose. Everybody was satisfied, including the justice."

TELEPHONE FOR USE OF LIFE SAVERS.

Steps are being taken to establish, in the Fifth Lifesaving district, a system of patrol telephones extending along the New Jersey coast from Cape May to Sand Hook. A metal box, fitted up with a set of telephones, will be placed at each half-way place where the patrols meet. This will enable the keeper of the station to communicate with the patrol and the patrols can call their attention in case of wreck or accident. Under the present arrangements, if a patrol saw a vessel in distress, he would have to run back to his station to report the matter, in doing which he would lose valuable time. William Bolton, superintendent of the government telephone lines, and the district lineman, Richard Winemiller, are making preparations for putting in the new system. Work will be begun as soon as possible in order that the system may be in working order by the time the crews are put on duty August 1.

The Telephone in Foreign Countries

A NEW ELECTRICAL ENGINEERING SOCIETY.

FOR some time past there has been a strong feeling on the part of the electrical engineers in the postoffice service in England that the great developments in every branch of telegraph and telephone engineering, and the increasing responsibilities of their position, justified the formation of a new organization which would enable them, by the exchange of opinions on matters of interest, to keep abreast of the rapid progress in various directions; and also to remain in touch with their colleagues, scattered, as they are, over the whole of the British Isles. Until recently, however, it was not possible to pursue the matter satisfactorily, owing primarily to the heavy demands on time and energy of the staff, which were necessitated by the establishment of the postoffice telephone exchange system in the metropolis, but now that the pressure has relaxed to some extent, further attention has been devoted to the subject, and as a result a conference was recently held in London, for the purpose of arriving at a decision.

The conference, which was attended by more than 100 engineers, included the great majority of the officers stationed within the metropolitan area, and also delegates from the postoffice engineering districts in England, Wales, Scotland and Ireland, and the latter, representing a staff of more than 200 engineers, received a very hearty welcome from their London confreres. The importance of the occasion was very fully emphasized by the various speakers, and appreciated by their hearers, and after a lengthy discussion it was unanimously resolved to form a definite organization, having for its title, "The Society of Postoffice Engineers," and it was decided that the administration of the affairs of the society should be vested in the hands of a president, vice-president, treasurer, secretary, and a council of eight members.

The following election of officers then took place: President, D. H. Kennedy, A. M. I. E. E., London; vice-president, P. Jarvis, Sunderland; treasurer, J. M. Crawford, London; secretary, J. W. Atkinson, 45 Arbuthnot Road, New Cross, London, S. E.

Arrangements were also made for the election of the council at an early date, and a subcommittee, comprising the officers and five other engineers, was appointed to draft the rules of the society on lines indicated by the conference.

The preliminary arrangements will be completed in the course of the next few months, and it is anticipated that by the preparation of programmes of lectures and papers, and in other ways, the society will be of material assistance in promoting the interests of the members.

* * *

AUSTRALIAN TELEPHONES.

According to the Sydney (Australia) Daily Telegraph the Postmaster-General, Sydney Smith, has made a further move in the matter of extending the telephone service through the country districts. He is rapidly bringing Sydney within reach of the principal towns on the main lines of railway, and proposes to do more in the near future. The extensions have been rendered practicable by the use of the condenser in connection with existing telegraph lines. On March 7 communication was opened up between Sydney and Orange through Bathurst, and the voices could be distinctly heard over 192 miles of wire. The Bathurst circuit was completed some time ago, but Orange, a further distance of 47 miles, was just finished. Here the condenser has been brought into use at the merely nominal cost of about £70. The original estimate for a separate telephonic service over this 47-mile stretch was £3,000. The estimated cost of a service to Wollengong was originally £3,100, but connection was established through the condenser for £170, of which sum no less than £105 was absorbed in making the ordinary repairs to the line, which would have been necessary in any case. On the same date the Postmaster-General also ordered Cowra to be connected with Bathurst, and thus through to Sydney. This extension covers some twenty-eight miles of new road, which has been bridged at a cost of something like £150, as against £3,600, which was the estimate of cost under the old system. Another project, which was to have cost £4,100 under the old system, has been developed for something under £200. Thus, in these four cases it has been possible to save approximately £13,300 by using the condenser, as against the old system.

* * *

THE TELEPHONE SERVICE IN RIGA, RUSSIA.

The telephone service in Riga, Russia, was formerly furnished by a Bell company. The Bell franchise having expired in 1904, an Independent company acquired its equipment and has since put in an entirely new plant, bringing the city's telephone system up to date in all respects. This city is the largest in the Baltics, having a population of something over 250,000. The people are not Russians, but are of a different race, and resemble more nearly the Germans. They are well educated and well advanced industrially.

The new installation is designed for 10,000 subscribers. At the present time there are 6,000 telephones working. At each end of the board additional panels are placed, so that each operator can reach all of the multiple jacks. Each section of the board has six panels, arranged upon the three-operator multiple plan. In front of each operator are 160 answering-jacks with sixteen pairs of cords, plugs and keys. The switchboard is of the common battery automatic-signaling type. The ringing apparatus is semi-automatic and so arranged as to ring the subscriber continuously for three seconds, after which the ringing key automatically restores itself. Large dials are placed over the top of each operator's position. These record the number of connections made by the operator. They are not intended as meters, but merely as a check on the operator's work.

The chief operator's desk is arranged with lamps for each operator, and a listening-jack, so that complete supervision is effected. The work of each operator is watched for a certain number of hours each month at unfixed times, and this serves as a check on the dials. At the present time twenty-one positions are served at the switchboard, but the number of subscribers is growing rapidly. The rates for labor are about the same as in the United States.

One feature of the distributing board is the double-test jack for each line on the switchboard side of the rack, which is convenient for the purpose of facilitating the location of trouble by inserting a double plug into this jack, the wire chief can at once test either outside or inside, at pleasure, and can tap the line as he wishes, without disturbing the lightning-arrester strips or the fuse coils. The battery consists of ten storage cells placed in lead-lined tanks. The battery room is separated from the other rooms. The charging outfit consists of a direct-current, 240-volt motor coupled directly to a thirty-volt multipolar dynamo. The

batteries have sufficient capacity to carry the switchboard during the time necessary to make any reasonable repairs to the charging outfit; hence, a duplicate charging equipment is not needed.

Throughout the city the entire system of wires is placed underground. There are no party lines in use at the present time. The service is not measured, except so far as toll lines are concerned, a flat rate being made to the subscribers.

* * *

THE TELEPHONE IN MEXICO.

Jose Sitzenstatter, who obtained the concession for the establishment of the new telephone system in the city from the Mexican government, says the Mexico City Herald, returned recently from a trip to the United States and Europe, which was made in the interests of the enterprise. While in Stockholm he interested the firm of L. M. Ericcson in the project, and the concession of Mr. Sitzenstatter has been transferred to them. Mr. Sitzenstatter states that the Ericssons will begin the laying of conduits for the underground system at once and that the city will be receiving service from the company within a year.

The firm of J. Lecomte & Son will lay the conduits for the new company, these conduits to be made of armored cement, by a process which Mr. Lecomte has patented in this country. It is said that one and a half meters of these conduits can be laid in a very short time—about thirty minutes—with the cement that will have to be used to-day, but with cement that has been obtained from Grenoble, France, laying and drying of the cement will occupy only twenty minutes for one and a half meters. W. Patterson, one of the best engineers of the Ericssons, and who had charge of the construction of the Ericsson telephone system at Moscow, Russia, which is said by Mr. Sitzenstatter to be one of the most modern and perfect in the world, is in the city and will immediately begin the laying of the conduits on a large scale.

Mr. Sitzenstatter has worked unceasingly on the project of a new telephone system for this city during the past four years, and although he has met with many disappointments and reverses in trying to realize his plans he has never lost faith in the ultimate success of his undertaking.

* * *

REPORT OF ORIENTAL TELEPHONE COMPANY.

The report of the Oriental Telephone and Electric Company recommends the payment of a final dividend of 3½ per cent on the ordinary shares, making 6½ per cent for the year, and the transfer to reserve account of £3,000, leaving a balance to be carried forward of £1,721. Of the companies financed by or associated with the Oriental, the Telephone Company of Egypt has declared dividends of 7½ per cent for the year on both its preferred and deferred shares. The Egyptian company has received a further contract for the government of the Khedive for the installation of more provincial telephone lines, and in order to provide capital for these lines and for other extensions of its business the Telephone Company of Egypt made an issue in July last of £60,000 of 4½ per cent debenture stock, part of an authorized issue of £200,000 and the 5 per cent mortgage debentures originally issued, amounting to £10,500, of which the Oriental company held £9,000. The Indian local companies have paid the same dividends as for 1903. The Bombay Telephone company has begun the putting of its wires underground. The Indian government has acquired the premises in the occupation of the Bengal Telephone Company in Calcutta, so that the company has had to shift its exchange (the government pays compensation), and there is also the job of putting the wires underground to be done there. In Rangoon, Moulmain and Madras work will be commenced within the next twelve months. At Singapore land has been purchased for a new exchange premises, and these are now in course of erection. The China and Japan Telephone and Electric Company has received a license from the Hong Kong government for a term of twenty-five years, and the system there will now be thoroughly overhauled and reconstructed. The report adds that the business at Hong Kong is progressing very favorvorably.

* * *

ENGLISH OPERATORS GETTING ANXIOUS.

A deputation from the National Association of Telephone Operators waited upon the Postmaster-General of England recently in order to place before him the views of the operators on the subject of the telephone purchase agreement which is now receiving Parliamentary consideration. Representatives (two male and thirteen female) of the operators at London, Liverpool and Manchester were present, headed by Miss Williams, a London delegate, who said the operators sought an assurance from the Postmaster-General of continuity of engagement or compensation to those operators who might be deprived of their means of livelihood by the operation of the agreement. Objection was taken to the proposal for a fresh medical examination of operators in the National Telephone Company's service at the present time, and it was suggested that instead of this examination being made the company should institute a medical test for all new candidates from August 31 next. It was asked that two consecutive years' service with the company should be taken as a guarantee of efficiency, and the Postmaster-General was invited to reconsider the matter of superannuation based upon the period of service of the employes. In reply the Postmaster-General promised to give the most careful consideration to the views put before him, and in regard to the medical examination promised to support the suggestion advanced by the deputation. On the subject of superannuation, however, he could promise no change from the views he had already expressed.

* * *

TELEPHONE FRANCHISES FOR PHILIPPINES.

The Philippine commission has passed an act granting to John I. Sabin and Louis Glass of San Francisco, a franchise to construct telephone and telegraph system throughout the Philippine Islands. Mr. Sabin is president and Mr. Glass vice-president of the Pacific States Telephone & Telegraph Company. Their comprehensive plan includes the locating of exchanges in the principal cities of the islands with long-distance telephone connection and also a telegraphic connection. Besides these improvements cables will be laid among the various islands.

Manila will in all probability be the headquarters of the new company. Already an agent of the company is on the ground attending to the preliminary work. At present there is an antiquated Spanish system in the islands supplying service to only 500 patrons. It is high priced and very slow and unpopular.

The promoters of the new system will invest half a million dollars in the project. As the systems expand the amount will be increased, so that in time as the business demands a corporation will be formed to keep abreast of the development. It will start, however, with money invested by Sabin and Glass, although possibly a third party may also be added. In working the telephone and telegraph in conjunction, but one wire will be used, as over a long-distance wire both a telephone conversation and a telegraph message can be conveyed at the same time without interruption of either.

* * *

TELEPHONE NOTES FROM ABROAD.

W. M. Talbott of Havana, Cuba, has been granted a telephone franchise in Marianao, Cuba.

The Cuban Congress has passed a bill empowering President Palma to grant at public letting a concession for

a long-distance telephone service. A guarantee of $50,000 will be required.

The city of Johannesburg, South Africa, has under consideration the laying of underground cables for its telephone system.

The Merchants' Association of Honolulu favors the installation of a new telephone system in that city. The matter has been referred to a committee composed of R. Catton, J. Emmeluth, J. F. Soper and others.

An association of telephone employes has been formed in England to protect their interest under the transfer to the government. Some 13,000 have, it is said, joined. The chief question at present is the demand for an equitable pension scheme for all the employes.

Over $40,000 has been voted by the Finance Ministry of Great Britain as a subsidy toward the extension of the telephone system throughout the Egyptian Delta, between Cairo and Alexandria and the chief provincial towns, such as Tantah, Kafr-ez-Zaiyat, Damanhur, etc.

According to a recent report, Berlin possesses a network of telephones which now numbers 86,000 apparatus actually in use. The telephone department divides the system of connections into several sections. No. 1 alone has 13,538 subscribers, while No. 4 comes in a good second with 12,884.

According to a statement made in the Cape House of Assembly, the telephone revenue of the Colony had increased, during the last ten years, from £6,300 to £43,000. Since January 1st last 165 new connections had been applied for, and there had been a number of inquiries for the establishment of new exchanges.

The Electrotechnische Zeitung announces that an arrangement has been concluded between the telegraph administrations of Hungary and Servia for the establishment of telephonic communication between Buda-Pesth and Belgrade. The Hungarian administration will extend the double line between Buda-Pesth and Neusatz an far as Semlin on the Servian boundary, and from there the Servian administration will construct a line up to Belgrade.

London Electricity says: "Llewellyn Thomas, a Mumbles joiner, well known for his eccentric habits, clambered up one of the telephone poles near the Rhondda Hotel, Oystermouth, and proceeded to make his way along the wires. He went for a few yards, but the wire broke under the strain, and he slipped into a quarry in the vicinity, in which there was some water. A bone was fractured and several wires were found twisted round his body."

A new microphonic telephone invented by Signor Mayorama, brother of the Italian Minister of Finance, has been tested between Paris and Rome, a distance of 1,133 miles, with excellent results. A trial of the telephone has since been made by sending messages from London to Rome with equally good success in spite of the transmission by submarine as well as by land cable. An English syndicate has been formed for the purpose of handling the invention.

Atlantic liners are now being equipped with special apparatus for receiving sound signals transmitted through the water from submarine bells. Microphones fixed in tanks on the port and starboard sides of the ship receive the signals and transmit them to telephones on the bridge. The light-ships on the American coast are being fitted with bells, which sound at regular intervals according to a numerical code, whereby the position of each bell is indicated to approaching vessels many miles away.

The Hong Kong Press says that the Telephone Company, in addition to opening an exchange in Kowloon, has resolved to reconstruct the entire system of telephone communication in the Colony at a cost of something like £10,000, and the work is to commence forthwith under the direction of the new manager, W. L. Carter. The reconstruction has been rendered necessary by the development of the tramways and the extension of the Electric Light Co.'s mains. The metallic circuit system is being substituted for the present earth return system. In the central portion of the city the cables are to be carried underground.

It was recently suggested to Dr. Collinridge, the medical officer of health for the city of London, that there might be danger of infection in the use of public telephone call offices. Diphtheria and tuberculosis were among the particular diseases specified as likely to be transmitted from one person to another by way of the transmitter mouthpiece, and in view of the importance of the matter it was decided to make a bacteriological examination. With the sanction of the telephone company, twelve mouthpieces were removed from telephone call offices, placed in sterilized water, and submitted to Dr. Klein for examination. As the result of experiments on two guinea-pigs, which were subjected to the possibility of infection from these mouthpieces, it was found that the animals were free from diphtheria and tuberculosis bacilli.

RETIRING MANAGER LEAVES EXCELLENT RECORD.

J. K. Johnston, having resigned as general manager and secretary of the Home Telephone Company of Elkhart, Indiana, it may not be out of place to state that at the time he took charge of the Elkhart exchange, July 1, 1903, the company had connected in Elkhart 724 subscribers. In two years' time, or on July 1, 1905, the company had connected 1,596, an increase of 872 subscribers, or over 100 per cent—a fine record. The last year's work has been in the face of strong opposition, as the Bell company has put in an entire new plant at Elkhart and has inaugurated an active canvass to regain its lost prestige and subscribers, but it has not met with success, as the Home company now has over 100 applications for telephones. The company also owns the exchange at Goshen, which is in a growing and prosperous condition, and its financial condition is A No. 1.

At a recent meeting of the board of directors of the Home company at Elkhart, resolutions were passed highly complimentary to Mr. Johnston, in part as follows:

"We desire to express our appreciation of his loyal, faithful and efficient services as manager of the Home Telephone Company for the last two years. We have found him a good, competent telephone man, whose careful supervision of the various details has made the service to our patrons as good as that of any exchange in northern Indiana, and brought with it corresponding prosperity for the stockholders. We most cheerfully commend him to any management that may be in need of a faithful and practical telephone man."

Mr. Johnston's plans for the future are not yet settled, but he is considering several good offers from other Independent companies.

WILL MAKE EXTENSIVE IMPROVEMENTS.

The Corn Belt Telephone Company, which recently acquired by purchase the plant and system of the United States Telephone Company of Iowa, has placed the authorized capitalization at $300,000. Just as soon as the reorganization is effected, it is announced, the work upon necessary and desirable improvements will be commenced. Plans are under way for the expenditure of a large sum of money in Waterloo and Cedar Falls, while the toll lines will be rebuilt and the service rendered more efficient throughout the entire system.

Telephony.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

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RECIPROCITY WILL BENEFIT TELEPHONE TRADE.

MERCHANTS' associations in the large cities throughout the United States have joined hands in a widespread movement to promote the adoption of reciprocity and reciprocal trade relations with other nations. Identified in this commendable endeavor are scores of big manufacturers, among whom are not a few engaged in the manufacture of electrical and telephone apparatus, and who will be largely benefited should the leaders in the movement succeed in their efforts.

Important changes have taken, or are about to take place, in the tariff system of nearly all the continental nations of Europe which have adopted, or have under contemplation the adoption of, high protective tariff duties on imports. Besides this very marked increase in tariff duties adopted by European countries, most of these nations have adopted a dual tariff system, under which they apply a maximum or general tariff on ordinary imports, and minimum, separate, or conventional tariff duties to those nations which make reciprocal concessions in their rates of duty, the difference in the two rates of duty, of the maximum and the minimum tariff, respectively, running from 15 to 75 per cent. The result of these new tariff systems adopted by the countries of Europe will be most disastrous upon the export trade of the United States. In addition to the high and prohibitive rates of duty imposed upon imports from the United States, our products will meet with the severe competition of other nations to whom the minimum tariff rates are conceded.

The very serious situation that confronts the export trade of the United States to Europe will be realized when it is considered that our total exports to Europe during the fiscal year 1904 exceeded the sum of $1,057,000,000, which was more than two-thirds of our total exports. The United Kingdom, which receives more than half of these exports to Europe, under its present tariff system will offer no barriers to our trade unless the agitation conducted by Mr. Chamberlain should be successful. Germany (after the United Kingdom our best customer), which receives $215,000,000 of our exports, France $65,000,000, Italy $35,000,000, and Switzerland, Russia, Austro-Hungary, and minor countries of the continent, will bar many of our exports through the imposition of these high rates of duty. Our principal articles of export to the continent of Europe are the following:

Wheat, barley, malt, dried apples, pears, apricots; fresh apples, salted meats, fresh and canned beef, eggs, cows and oxen, cotton, shoes, leather, electrical machinery, telephones, railways and street cars, machinery of various kinds, agricultural implements, rye, corn, potatoes, peaches and prunes, sausages, butter, canned salmon, oleomargarine, horses, lumber in rough, machine tools, electric lighting and power apparatus, motor cars and motor bicycles, typewriters, oats, wheat flour, hops, lard, cheese, tobacco, wood alcohol, hogs, sewing machines, telegraph and telephone instruments, naval stores, petroleum and oils.

All of these articles will be seriously affected by the proposed tariff changes in most of these continental countries.

The new tariff system of the empire of Germany, which goes into effect during the first half of the year 1906, not only doubles many of the rates of duty upon our chief articles of export, but also by the reciprocal treaties entered into by Germany with a number of European nations will place us at a still greater disadvantage. The same condition will shortly meet us in Austro-Hungary, where the proposed new tariff is expected shortly to be adopted. As an instance of the disastrous effect of these new high tariff rates of duty upon the exports from the United States, it is sufficient to mention the article of cottonseed oil, the

duty upon which will be quadrupled, which will destroy our cottonseed oil export trade to that country.

Russia raised her rates of duty on our exports by from 50 to 100 per cent in 1901 in retaliation for the countervailing duty imposed by the United States on Russia sugar, and has now adopted a maximum tariff which increases these retaliatory rates of duty, and which will no doubt entirely check our export trade with that country. Our total exports to Russia in 1904 were $31,200,000, as against imports of $2,200,000.

The republic of France after the passage of the McKinley act, adopted a high protective maximum tariff and a minimum tariff, with the result that during the last six years our exports to France have shown no increase, except in a few limited articles on which France gave the United States reductions in duties in exchange for certain slight reductions granted by the United States under Section 3 of the Dingley act, and it is noteworthy that our exports to France covered by this reciprocal agreement have increased from 1898 to 1903 by 46 per cent.

Italy granted us reductions under her minimum tariff on a limited number of exports with the same result as in the case of France, namely, that our exports of the few articles on which Italy grants us her minimum rates have shown a very large increase, whereas our exports of such articles as are subject to the maximum rates have not increased materially.

In Switzerland, which republic has always been a good customer of the United States, we shall be subjected to the maximum rates of duty under the new Swiss tariff shortly to be put in force.

The Merchants' Association of New York, after carefully considering the conditions with which our trade is threatened, has adopted the subjoined resolutions:

WHEREAS, The principal nations of continental Europe, following the example of the United States, have adopted or are about to adopt high tariff rates of duty on many products of the soil and of manufacture, the imposition of which on the products of the United States cannot fail to most injuriously affect the welfare of the varied interests of this country; and,

WHEREAS, These European countries have also adopted or have in contemplation a system of preferential tariff rates of duty to be accorded to those nations that are willing to offer similar reciprocal reductions in their rates of duty which would enable countries so favored to underbid our products in European markets; now, therefore, be it

Resolved, That the Merchants' Association of New York heartily favors the conclusion of reciprocal treaties of commerce between the United States and these European countries by which an enlarged trade and extended markets for our products may be secured; and be it further

Resolved, That a committee of five be appointed by the president, which committee shall urge upon the government of the United States and upon the Congress of the United States the importance of the adoption of such reciprocity treaties, and shall place itself in communication with all commercial and agricultural associations or bodies throughout the United States for the purpose of soliciting their co-operation in securing the conclusion and ratification of such commercial treaties of reciprocity.

It appears to us that the time has now come when the United States should adopt a policy of reciprocal trade agreements, in accordance with the last words of ex-President McKinley, for the purpose of preserving and extending our export trade and gaining more outlets for our growing agricultural and manufacturing products. With this end in view we should seek to establish reciprocal trade relations not only with the countries of Europe, but also with our immediate neighbors on the north and south. It would vastly benefit both the electrical and telephone, as well as all other industries. The most striking illustration of the benefits that follow the cultivation of better trade relations by reciprocal tariff reductions can be witnessed in the extraordinary growth of our exports to the Island of Cuba, which, it is estimated by the bureau of statistics of the Department of Commerce and Labor, will during the fiscal year ending June 30, 1905, reach the total of $38,000,000, showing a very large increase as compared with the previous fiscal year, and a much larger increase as compared with the fiscal year immediately antedating the reciprocity convention with Cuba. The fact also is significant that, whereas our imports from Cuba, have increased 33 per cent, our exports to Cuba have gained 80 per cent since reciprocity was adopted.

The business interests of the United States should take prompt and active steps, both collectively through their trade organizations and individually, to impress upon the president of the United States and his advisors the important necessity that exists for the negotiation of reciprocity treaties with our neighbors and our principal customers abroad, and to urge upon senators and representatives in congress that such reciprocity treaties should promptly be ratified, in order to preserve our present trade and enlarge it. When once lost or taken from us it can not be recovered except with great difficulty.

OVER THE BORDERS.

FOR reasons which it is not fundamentally simple to understand or explain, telephone development in the way of invention and exploitation has been far more active and efficient in the United States than in any country of the world, with the possible exception of Sweden. This may not be explained by saying that the invention was of American origin, because Professor Bell is of Scotch ancestry, and has said that he conceived the thing while living in Ontario, Canada. It cannot be because of the wealth of our country in physical resources, because other parts of the continent are almost equally fortunate, if a fair view of averages be taken. It seems untenable to assume that we have made great development because some of our cities are densely populated, because there are cities in Europe and elsewhere which are still more densely populated. It is equally unlikely that the explanation lies in our greater need of communication because of the great distances between social centers in some parts of the country, for both to the north and to the south one may find these conditions in even more striking degree.

Failing explanation in all these directions, there seems to be no other conclusion than that we are a peculiar people of much resourcefulness, accustomed and inclined to do things with amazing promptness, and sometimes with intemperance, needing only a suggestion to set us busy.

But the status of this phase of communication may not be expected to remain fixed in other countries more than in ours, and it seems unreasonable to assume that the rate of progress in other countries will not increase, and that in time similar conditions will exist in all.

Evidences of telephonic activity among our neighbors are not lacking. Mexico City is being treated not only to an extension of a system now in operation, but to the installation of a new one, for which the funds and mechanism are said to come from Sweden. It is currently reported that a large new equipment, anticipating an increased development, has been ordered for the city of Havana, the capital of our island neighbor, the three-year-old republic. A parliamentary commission is now sitting in Ottawa, Canada, its avowed purpose being to inquire into the "operations of telephone systems in the Dominion of Canada, in the United States, and elsewhere," with the view to determining whether there are changes to be made which will result in telephonic advantages to be enjoyed by the people of Canada.

It is interesting to observe that all persons having successful commercial relations with consumers outside of the United States, are unanimous in the statement that American manufacturers, if they have shortcomings at all, are quite uniformly inclined to disregard certain principles long understood by German and other foreign dealers with reference to export salesmanship. There is a striking

unanimity also in the reports of our foreign consuls to the effect that American manufacturers must consult the tastes, desires and peculiar local conditions of foreign buyers.

It seems conceivable that a day may come when telephonic saturation may be approached in the United States, and after which the larger activity of telephone manufacture will be required for the production of apparatus and materials for maintenance and replacements. In such a time it would seem wise to be fully equipped and sufficiently connected to enable an increasing foreign business to make up for a falling off in domestic output. The plain moral, therefore, must be that the time to begin making such foreign connections is to-day.

"ETERNAL VIGILANCE" AT LAST.

THE National-Interstate Telephone Association, having opened general headquarters at Cleveland, immediately has entered upon a campaign of showing up the fallacy of the Bell's reiterated claims of the advantages to be derived by Independents through the connecting up of Independent exchanges with its toll lines. It also is taking up the misleading and false reports constantly being circulated by the Bell's cohorts for the purpose of injuring Independent properties in different parts of the country, and by a publication of the true facts in these different instances it is opening the eyes of the public as to Bell methods, setting matters right in communities where the seed of Independent distrust has been planted by the enemy, and scattering the forces of Baal like chaff before the wind. The Cleveland St. George has appeared, which accounts for the sudden check in the fire-eating career of the Boston dragon. Its literary attacks upon Independent systems, in all parts of the land, will now be promptly dealt with, and the public will enjoy the unique experience, in instances innumerable, of getting both sides of the case, and the truth.

The following letters from association headquarters, bearing upon the points above mentioned, are self-explanatory:

James B. Hoge, Esq., Cleveland, Ohio.—Dear Sir:—As you are no doubt aware, this company tried the experiment of allowing the Central Union, or Bell Telephone Company, to connect up its wires with its two principal exchanges. The reason this was done was that we had heard so much about the benefits our company would derive, etc. We were anxious to do whatever was for our best interests, and prevent possible competition. The connection was made on May 9 and continued until July 18. We tried to give the matter a fair and exhaustive trial. All our subscribers were advised of the connection and allowed their choice of service. We found that nearly 90 per cent wanted the Independent connections, and that we could reach many more stations over the Independent lines than we could over the Bell lines. During this entire period we had but very few calls for points reached exclusively by the Bell, and had several dozen calls that could not be reached over the Bell line.

After carefully considering the matter from every side, we were forced to come to the conclusion that the connection was of no benefit to our company. Much to our disadvantage and annoyance in many ways, even had it been possible for us to have continued the connection between both the United States lines and the Central Union, or Bell, lines, we ordered the connection severed. We did this with a full knowledge that the Central Union would put in an exchange and make us what trouble they could.

With our best wishes for the future success of the Independent telephone movement in Ohio and elsewhere, we are,

Yours truly,
A. A. Whitney, President.
Mark Cook, Secretary.
Morrow County Telephone Company.

Mt. Gilead, Ohio, July 19, 1905.

J. B. Hoge, President National-Interstate Telephone Association, Cleveland, Ohio.—Dear Sir:—Referring to your recent inquiry based upon a story in "Finance" relating to telephone conditions in Jasper, I have just received a communication from William D. Curll of Petersburg, vice-president of the ninth Independent telephone district, upon that subject which I quote for your information:

"I am in receipt of your favor of recent date inclosing clipping from 'Finance,' in which they refer to local conditions at Jasper. I have just now sent the matter on to my assistant in that county, Hugo C. Rotheert of Huntingburg, Indiana. He is a heavy stockholder in the Dubois County Telephone Company and a stockholder and a director in our company; also cashier of one of the banks in his town. Now without having a report from him, I will say that I know the item to be a lie made out of the whole cloth, for the Dubois company is paying good dividends. Just a few days ago Frank Joseph of Jasper, Indiana, cashier of the Dubois County State Bank—a man of wealth and reputed a good financier—purchased ten shares of stock in my company, and this week we had another call for stock from Jasper. Further, our plant has never been bonded, and we have a standing offer from moneyed men and the banks in Dubois county that when we do bond it they want to take the entire issue. So to my mind this is the best evidence that what is said in the article is a lie. Then I am told by officers of the Dubois company that their stock is selling at a small premium."

Yours truly,
George W. Beers.

Fort Wayne, Indiana, July 21, 1905.

OFFICIAL BULLETIN NO. 1.

BULLETIN No. 1 of the National-Interstate Telephone Association, which has opened headquarters at Cleveland, Ohio, will be found on page 38 of this issue; it is especially important, as it is the first official utterance from the association's executive heads since the recent convention at Chicago, where so much of importance was transacted, not alone in labor accomplished at the moment, but in work mapped out for the future.

After stating that general headquarters have been opened at Cleveland and that files have been secured with a view of gathering complete information on the telephone situation in the United States, the bulletin touches upon matters of vital interest to every man engaged in the Independent telephone business, and which should be given earnest and active consideration by all those to whom it appeals. It is highly important that state associations should *at once* furnish the National-Interstate officials with maps and general statistics of Independent development, etc., in each state, as in that way only can the extent of the Independent movement be made known to the national organization.

The matter of assessments should also receive prompt attention, as it is essential for the carrying out of the work of the parent association that it shall in no way lack in the matter of finances. It will cost money to spread the Independent propaganda along the progressive and aggressive lines laid down at the National convention, and the great scheme of organization planned at the same time will need the financial backing of all state and district organizations in order that there may be no hitch in the work. The assessment matter, as applied to the companies making up the membership of the various state associations, is a minor question in the abstract, but in the concrete it is a most important proposition. The assessment of *one cent per unit* should be met promptly and enthusiastically, for what will benefit one will benefit all, and vice versa.

As to the shield emblem selected at the Chicago convention as the permanent insignia of Independent telephony, there seems to be but one opinion, and that is, that the committee having in charge the selection of a design acted wisely. Associations, companies and individuals are hastening to adopt it, and it will be only a question of a few years when the tri-color shield of Independent telephony will become as familiar and well known in connection with the great and growing movement, as the blue bell now is known as the universal sign of the Bell interests. Bulletin No. 1 treats the subject of the official shield as follows:

Almost every mail since the convention has brought inquiries from all parts of the country for prices on standard toll signs, stationery and other supplies bearing the official shield adopted at Chicago. At the request of a number of Independent people, in order to have the shield generally adopted throughout the country as soon as possible and to enable all the Independent companies to secure toll signs, stationery, etc., bearing the official shield, at reasonable prices, arrangements have been made whereby especially low prices can be secured on toll signs, directory covers, letter heads, envelopes and business cards. In order to get these low prices and make it possi-

ble to have the standard emblem adopted quickly, and at the same time cheaply, it will be necessary to have the support and co-operation of the various Independent companies. Price lists will be ready about August 1 and will be forwarded to anyone interested.

Inquiries regarding the shield should be addressed to the assistant secretary at Cleveland.

Bulletins similar to the one herewith mentioned will be issued monthly from general headquarters and will be published in TELEPHONY. They should be carefully read by every Independent and preserved for future reference.

INSECT FOE MENACES AMERICAN TELEPHONE SYSTEM.

WHEN John Hesketh, electrical engineer for the state of Queensland, Australia, was over here last year to attend the International Electrical Congress at the World's Fair, he read a paper on the insect that had caused so much damage to the lead-covered cables of the telephone systems in his country. The technical appellation of this insect foe of telephony is ponderous and awe-inspiring; in common parlance it has several names—Jesuit beetle, elephant beetle, xylopertha beetle, etc. The damage it has done and still is doing in the Antipodes to telephone cables is incalculable.

About the same time Mr. Hesketh was here there appeared in Texas, according to reports, an "unnamed species of bug" that bored into the lead sheathing of cables, and which, at the time of its discovery last summer, had done thousands of dollars worth of damage. It was hoped that the "telephone bug" could be confined to Texas and there exterminated, but it now appears that the little insect was too smart for his enemies in the telephone field. Wisconsin—a thousand miles from Texas—now reports an invasion of the destructive pest. The insect has made its appearance at La Crosse in the form of a worm, the Press of that city referring to its appearance and discovery as follows:

"One of the worst enemies known to telephone service has just been discovered in La Crosse. It is a worm about a half inch in length, with a Latin name many times longer, but known among telephone men as the Australian worm because it was in that distant English colony where it was first reported and where it worked its greatest destruction. The worm bores through solder, lead and brass and, as it propagates rapidly, soon, unless checked, works great damage wherever it appears. Seven of these worms were discovered in a box of the Wisconsin Telephone Company at Thirteenth and State streets. Each was imbedded in a fuse and when shaken out a small quantity of shavings from the fuse fell out with it, showing what it had already done in that instance. Several of the worms were secured for experiments to identify the species positively and the rest were killed.

"It is believed the worm's work thus far has been confined to the fuses as, had it been operating on the overhead cables where it is most dreaded, the recent heavy rains would have disclosed the fact. When working on the cables the worm bores through the metallic covering, and the paper isolation thus exposed to the weather, becomes damp during rains and thereby worthless, necessitating immediate repairs to the cable.

"Scientists have for some time sought a way to exterminate the pest, but have not yet found a satisfactory solution. Where they are only few in number, however, it is hoped the local companies by constant vigilance can get rid of them."

This is not cheerful news to the telephone fraternity of the United States to know that they may have this dreaded insect pest to reckon with in the future. It is not believed, however, that it will spread over any great territory, and even should the pestiferous insect decide to become a general American institution, like the boll weevil or the chinch bug, for instance, in all probability means would soon be found to check its destructive progress, if not to entirely exterminate it.

TELEPHONE GIRL HELPS PREPARE VACATIONS.

BUSY days are at hand and ahead for the telephone girl. It is when spring begins to turn to summer and the city houses are closed one after another, while the family goes to the country for its vacation, that the telephone subscriber begins to realize how very useful "central" can be made. Of course the housewife has given the last orders to the butcher, the baker and the laundry man; she has notified the police to keep an eye on the premises; she has engaged seats in the Pullman or staterooms on the steamer; she has said good-by to all the friends and relatives in town and for twenty miles round about, probably; she has engaged the expressman to take away the trunks and finally has called the carriage. But her work does not end there, by any means. Many telephone subscribers nowadays leave their summer addresses with "central" when they go away, and anyone who tries to call them up not knowing that they are out of town, is told where they may be reached.

If one member of the family stays in the house alone during the week and runs up country over Sunday, the telephone is a great comfort and convenience. No house where the little bells tinkle every hour or two during the day and night can be utterly lonesome. There is always the means of calling the doctor in case of sudden illness or summoning any kind of help when it is needed; and most appreciated of all, perhaps, there is the means of constant communication between the vacationists and the stay-at-homes since the telephone has made its appearance on the farthest stretch of the seashore and in the most distant cranny of the mountains. Countless families that are separated six days in the week during the summer have their daily chats over the wire, so that they are always sure that "everything is all right" at both ends of the line.

Once in a while the long-distance telephone in particular helps some hapless traveler out of an uncomfortable scrape. Not long ago a party of young men who had gone to the northern Michigan lakes fishing found themselves in a painful dilemma. The treasurer of the company, having been dumped out of a canoe and fished back to dry land with some considerable difficulty, discovered to his dismay that somewhere on the bottom of the pond from which he had just escaped were reposing the whole financial resources of the outfit. There was no time to write back home for money, for the nearest postoffice was nearly ten miles away and the week's end was fast approaching. A telegraph money order was out of the question, for the operator in the little office eight miles through the woods not only had never seen money enough, probably, to take five young men home comfortably after their fortnight's bills had been paid, but did not have a money order department anyway.

There remained the telephone, however, and ten minutes to get hold of a friend in the city and arrange for an express remittance solved the whole difficulty. Although they were penniless they had no trouble in arranging their long-distance call by having the charge reversed, so that the toll was put on the bill of the subscriber they called up; and now there are five young sporting enthusiasts who consider the telephone the greatest life-saver in the world.

The Cuyahoga Telephone Company of Cleveland has introduced the use of bicycles for the use of the trouble and emergency men, and General Manager French is greatly pleased with the results.

Standard Operating Rules and Regulations

Report of Committee at National-Interstate Convention.

THE following set of standard operating rules and regulations were presented at the National-Interstate convention and ordered adopted by that body as a standard for all Independent companies. They were compiled by a committee of C. E. Foote, chairman, Citizens' Telephone Company, Grand Rapids, Michigan; William Moellering, secretary, National Telephone and Telegraph Company, Fort Wayne, Indiana; J. P. Boylan, Cuyahoga Telephone Company, Cleveland, Ohio; William Handlan, National Telephone Company, Wheeling, West Virginia; A. L. Tétu, Home Telephone Company, Nashville, Tennessee; A. B. Conklin, Interstate Telephone Company, Aurora, Illinois. The committee report, in full, follows:

GENERAL.

1. Employes shall thoroughly familiarize themselves with the following instructions. Ignorance of these instructions will not be accepted as an excuse for their non-observance.

2. Employes shall report promptly for duty at the hour designated, and shall not absent themselves from duty without first obtaining permission from their superior officer. If unable to report for duty at the hour assigned, an employe shall report as soon as possible, preferably by telephone, the cause and probable duration of the absence.

3. Employes shall be courteous in all their dealings with one another, and with the patrons of the company, and shall conduct themselves in a quiet and orderly manner while in the building.

4. While on duty in the operating room, employes shall hold no conversation with one another, beyond that necessary in the proper performance of their work.

5. Employes in the operating room shall speak in low and distinct tones directly into the mouthpiece of the transmitter. The receivers must be retained at the ear continuously while the employes are on duty.

6. All employes in the operating room, except the chief operator and the assistant operator, are to be assigned personal numbers, by which they will be known in connection with the various records placed on the tickets, and in their dealings with the public.

7. No employe in the operating room, other than the chief operator and assistant chief operator, shall give her name to any patron. If her name is requested, her number should be given.

8. Employes shall not divulge any information obtained from listening on telephone connections. The attention of employes is called to the fact that the law makes it an offense, punishable by a fine or imprisonment, to violate the secrecy of telephonic communications.

9. Employes are forbidden to receive from the public written or oral communications for transmission or delivery to others. This does not apply to the repeating of messages or the making of appointments.

10. Employes are forbidden to use the circuits for connections that are not in the nature of the company's business requiring immediate attention, except when paid for. The use of the circuits for the company's business should be restricted to the smallest possible amount.

11. Employes shall keep the switchboard apparatus, which they use, in a neat and orderly condition. Keyboards must be kept free from everything not required for the handling of the service. When inserting or removing a plug, the employe shall not pull or push on the cord, but grasp the plug itself. When stamping a ticket on a calculagraph, the levers should be handled with care, and sudden and jerky movements avoided.

12. All employes, when ringing on lines, shall be careful to give clear and distinct rings.

13. All employes shall familiarize themselves with the code and with the signals used in the local offices for indicating "Busy," "Out of order," etc., where such signals are used.

ORGANIZATION.

14. The force in the operating room shall consist of a chief operator, with assistant chief operators, if necessary, supervisors, operators, clerks and office messengers. The chief operator shall report to and be responsible to the manager or superintendent.

The supervisors shall report to the chief operator, and the different operators, such as recording, line, through, desk, etc., shall report to the supervisor who has charge of that part of the work with which they are associated.

The clerks and office messengers will report to the chief operator, but be under the supervision of the different supervisors as they are employed in their divisions.

RESPONSIBILITIES AND DUTIES OF EMPLOYES—CHIEF OPERATOR.

15. The chief operator shall be responsible to the manager or superintendent for the conduct and discipline of her operating force. She shall see that the operating rules are enforced, and will make such arrangements or recommendations as may be necessary to provide at all times a competent operating force for the handling of the business.

16. She shall prepare a schedule of the operators working hours, so that the service will be properly handled at all hours.

17. She shall assign to each one of her subordinates, except the assistant chief operators, a number to be used in place of her name or initials, in connection with her work in the operating room and in dealing with the public.

18. She shall see that all her subordinates are properly instructed in the details of operating and that such instructions are closely followed.

19. She shall see that the operating loads are properly distributed among the various operating positions, so that uniform service can be given with the greatest efficiency.

20. She shall see that her subordinates are supplied with and understand the rules regarding the proper routing of calls.

21. She shall see that the tickets, in connection with each day's business, are gone over with a view of adding any information that may have been omitted, or correcting any errors that may have been made by the operators in filling out the tickets. The calculagraph stamps on the tickets must be clear and accurate. When, on account of poor service, it is necessary to reduce the time of a connection from that indicated by the stamp of the calculagraph, these reductions in time shall be authorized and fully explained by the chief operator, and the corrected elapsed time written across the calculagraph impression. Special effort should be made to have the names of the patrons spelled correctly and written legibly on the tickets.

22. She shall see that all troubles, either on the lines or in the apparatus, are promptly reported to the wire chief.

23. She shall see that the switchboard apparatus is prop-

erly marked in a standard manner and that such markings are kept up-to-date.

24. She shall see that all complaints and miscellaneous requests from the patrons in connection with the service, are courteously received and promptly handled.

25. She shall report at once to the manager or superintendent any serious delays, troubles, loss of facilities, congestion of traffic, etc., and shall keep him advised upon all matters of importance.

26. She shall have the authority to employ and dismiss her subordinates, subject to the approval of the manager or superintendent.

27. She shall have the authority to cancel or reduce the charge for a message on which the service has been unsatisfactory, full explanation being made on the ticket, or on a memorandum record attached to the ticket.

28. She shall keep a log record of important daily occurrences.

29. In the absence of the chief operator, her duties shall be assumed by the assistant next in authority.

30. When necessary, she shall see that all messages are checked daily with their proper checking offices, between the hours of 10 o'clock p. m. and 7 o'clock a. m.

31. She shall keep a record of all the employes under her jurisdiction, this record to contain the operators' personal numbers, numbers of lockers, receivers, transmitters, number of errors made, punctuality, conduct, etc.

32. She shall see that no unauthorized persons are allowed in the operating room at any hour of the day or night, and that no visitors or employes of other departments are permitted to interfere with the work of the operating force.

SUPERVISORS.

33. The supervisors shall be responsible to the chief operator for the quality of the work performed, and shall have direct charge of the operators in their respective divisions. They should personally superintend the work of each individual operator, coaching those who fall below the standard, reproving those who are careless and indifferent, and straightening out any minor difficulties that may occur in the routine of their work. They shall deal personally with all petty infringements of the rules or faults in operating, but in case of any serious trouble, they should at once bring the matter to the attention of the chief operator. They shall straighten out, as they occur, any disputes between the operators in their divisions and the operators in other offices, and shall adjust, as far as possible, any disputes with patrons with respect to the service. Any disputes with the patrons or with other offices that they are not able to handle, they shall refer to the chief operator.

34. They shall see that all signals are answered promptly, and that good team work is obtained by co-operation between the adjacent operators.

35. They shall relieve the operators of any details which tend to prevent the prompt handling of calls.

36. They shall report to the chief operator any serious delays, troubles, loss of facilities, shortage of circuits, or congestion of traffic, busy local and office trunks, etc., and shall keep her advised on all matters of importance.

37. They shall see that the calls are promptly distributed and handled, and continually examine the tickets of their subordinates in order to detect errors, so that they may be corrected as they occur.

38. They shall gather the tickets that have been completed in their divisions at least every hour, and turn them over to the chief operator, or in the larger offices, to the ticket clerk.

39. They shall take up delayed calls with the supervisors in other offices as they are referred to them by the operators in their divisions.

40. They shall have a schedule of the employes in their respective divisions.

LINE AND RECORDING OPERATORS.

41. The line and recording operators are responsible to their supervisors for rendering accurate and rapid service to the patrons, free from all interruption, and for handling the company's lines in a businesslike manner, with the view of obtaining in their use the best possible efficiency.

42. They shall not refuse to carry out the requests or orders of distant operators unless previously and specially instructed to do so by their superior officers. Operators shall never dispute with one another over the circuits or over methods of operating. Any differences affecting the service should always be referred to the supervisor.

DESK OPERATORS.

43. In offices of sufficient size there shall be a desk operator, or operators, if necessary, to handle and to keep records in connection with certain details of the toll operating that it is not advisable to have the regular operators handle. The desk operators shall not put up connections of any portion of the regular routine business, but are to handle that portion of the operating that is exceptional, and that requires special attention.

44. They shall keep a record of all "leave word" calls as they are referred to them by the line operators, both in connection with "sent" and "received" tickets.

45. They shall keep a record of all appointment calls, both "sent" and "received," and notify the line operators five minutes before the time of the appointment.

46. They shall, if practicable, repeat all messages on which the parties are unable to talk direct.

47. They shall, when requested, quote rates both to the patrons and to the operators.

48. They shall have copies of the local telephone and city directories, and shall, upon request from the line operators, look up numbers and addresses, and help locate parties called for. The telephone directory shall be kept up-to-date by daily entries of changes and additions in the list of subscribers.

49. They shall send all messengers.

50. They shall try upon request from the line operators "don't answer" and "busy" telephones, reporting back to the operators the results of their attempts to obtain the parties desired.

51. They shall answer miscellaneous questions in connection with the service, both from the public and from the operators. It is not the intention in any office where desk operators are employed, that any line or recording operator should answer any question or supply any information, except in connection with the ordinary routine of her duty.

OFFICE MESSENGERS.

52. The office messengers shall be responsible for transferring tickets and orders in the operating room from one employe to another, when requested to do so.

TICKET CLERKS.

53. Ticket clerks shall be responsible for arranging and sorting the tickets of an office and getting them ready for the toll accounting and billing department. The special details necessary for the clerks to follow in handling the tickets will be supplied by the chief operator.

TICKETS.

54. There shall be three forms of tickets used, "sent," "received" and "through" tickets. A "sent" or "received" ticket that is used for a night message shall have the word "night" endorsed across its face.

55. Tickets are to be filled out and reported for all calls made in connection with handling the service, except between chief operators and wire chiefs and their subordinates at instruments treated as part of the switchboard. Instruments that are considered to be a part of the switchboard are chief operator's, supervisors,' desk operators', recording operators', line operators', and wire chief's sets.

HANDLING CALLS—RECORDING.

56. The recording operator shall answer the party calling by saying, "Long-Distance," and shall obtain and record on a "sent" ticket the following information:

1. The name of the person desiring service, if possible.
2. The telephone number of the party calling.
3. The initials and names of the particular person or persons desired.
4. The telephone number and name, or name and street address, or the name of the firm desired.
5. The name of the place called for (city or town, and state).
6. If the particular person desired is out, the further wishes of the parties.

57. In obtaining the above information, the recording operator shall allow the party calling to give the call in his own way without unnecessary interruptions, asking only such questions as may be necessary to complete the ticket.

58. The recording operator shall verify the call, by repeating back to the party calling the details as received.

59. The recording operator, after having verified the call, will ask the party calling to hang up his receiver, first saying, "We will call you."

60. The recording operator shall record on the ticket the time received and her personal number, and then send it to the proper line operator.

61. The recording operator shall secure and record on "collect" or "reversed" calls the name of the party calling, and shall write the word "collect" in the proper place on the ticket.

62. The recording operator, in case the party calling desires to talk at a specified time, shall write in the space headed "apt" the time at which he wishes to talk.

63. If the party calling desires to have a messenger sent to the address of party called for, the recording operator shall ascertain whether or not he wishes word left for the party called for, if not, to come to the telephone. If the party calling desires word left for the party called for, if out, to call, the recording operator shall write in the space headed "M. G.", the code symbol, "L. W." If the party calling desires the call canceled, if the party called for is out, the recording operator shall write in the space headed "M. G.", the code symbol "C. C." The messenger charge will usually be paid on all calls by the party calling. On a "collect" or "reversed" call, if the party calling will guarantee the messenger charge, this charge can also be sent "collect," to be paid to the messenger, at the time, by the party called. If the party calling refuses to guarantee the messenger charge, the recording operator shall refer the patron to the chief operator, who will use her judgment as to the advisability of accepting the call.

64. If the party calling desires to obtain any one of two or more persons at the telephone of the party called for, the recording operator shall enter the names on the ticket in the order in which they are desired, separating the last two by the word "or."

65. If the party calling desires to place more than one call at the same time, the recording operator shall make out a separate ticket covering each call, and record on the back of each ticket a number to indicate the sequence in which the party calling desires the call completed, and fasten all the tickets together and send them to the line operator handling the line to the place called for on the first ticket. If the party calling desires to place more than one call at the same time, but does not care to have them completed in sequence, they shall be sent to the different toll line operators as though they had been received separately.

66. The recording operator, in case part or the whole of the circuits to the place called for by the party calling are temporarily out of service, shall, when taking the call, notify the patron of the probable delay in completing the call.

67. The recording operator shall refer to the desk any requests for information which she cannot answer, such as points reached, rates, parties calling up in connection with "leave word" calls, appointments, messengers, etc.

68. The recording operator, when requested for a report in connection with a call already placed, shall connect the patron to the line operator handling the call, if facilities are provided for doing so. If not, she shall obtain the information desired, and give the report to the patron direct, or connect the patron to the desk operator.

69. The recording operator, upon receiving a call from a telephone that requires an "O. K." from the proprietor or clerk in charge, shall, after the call has been taken, ask the patron to request the proprietor or clerk to come to the telephone, and the recording operator shall explain to him that a long-distance call has been placed from his telephone, and shall ask that he collect the charges from the patron, and shall obtain the clerk's name. It is expected in most cases that these calls will come to the recording operator on recording trunks having a special designation on the lamp caps. If not, it will be necessary for the recording operator to have a list in front of her of all telephones requiring an "O. K."

70. The recording operator shall, if necessary, have a list of "barred" or "no toll" telephones at her position, and shall refuse to take calls for toll service from any of these telephone numbers. When arrangements are made so that the exchange operators refuse to give toll service from "barred" telephones the list referred to above will not be necessary.

SENT CALLS.

71. The line operator, upon receiving a ticket from the recording operator, shall at once take up a line to the distant office, if one is available, and ring. At the same time, if she expects to complete the call within ten minutes, she shall take up the line of the party calling, without ringing, at the subscriber's multiple which is within her reach, or by means of a trunk to the switching position in the local exchange where the call originated.

72. If it is necessary in order to obtain the distant office to switch through one or more switching offices, the line operator shall take up the line to the proper switching office, as indicated by the route book, and ring.

73. When the operator at the office desired answers, the line operator shall say "ticket," and pass the details of call in order as written on the ticket. The distant operator will verify the call by repeating back to the line operator the details of the call.

74. If the office desired is obtained through one or more switching offices, the line operator shall, when the switching operator answers, say, "———— (Name of office desired) for ———— (Name of office calling)." The distant operator will acknowledge order, and either make connections to a circuit to the office desired or to a second switching office, or take the details of the call as outlined under "Through Calls."

75. When the party called for has been obtained, the distant operator will notify the line operator, who will at once ring the party calling, whose line she has been holding, and when the party has answered, tell the party calling that the connection is ready.

76. Before connecting either of the parties to the line, the line operator and the distant operator shall speak to one another in order to assure themselves that the circuit is in condition for service.

77. The line operator shall then order the distant operator to connect the party called for to the line. She shall then connect her party to the line and start the conversation, stamping the ticket and monitoring the message by cutting in on the connection at frequent intervals, always being careful when doing so to cut out the transmitter.

78. At the end of the conversation when signaled by the operation of the supervisory signal, the line operator shall at once cut in on the connection, and if the conversation is finished, stamp the ticket, and take down the connection, first ringing on the toll line to clear the circuit. On calls from the telephones requiring an "O. K." from the proprietor, the line operator, when the conversation is completed, shall at once report to the proprietor the amount of the charge for the service, and enter the charges and her number in the proper spaces on the ticket.

79. The line operator shall not hold a toll circuit after passing the call to the distant office unless requested to do so by the distant operator, or in case the circuit is built up through one or more switching stations, when the circuit may be held for five minutes in order to give the distant operator time to obtain the party called for, or at least a definite report. When a line operator is holding a toll circuit, and is waiting for the distant operator to obtain the party called for, or make a report, she shall cut in on the circuit at frequent intervals so as to prevent any other office from obtaining the circuit.

80. The line operator upon receiving a report from a distant office indicating that the connection will be delayed shall release the line of the party calling. Under no circumstances should the line of the party calling be held longer than ten minutes. When the line operator releases the line of the party calling, she shall tell the party the nature of the report, or reports, that have been received from the distant office, and make such additional reports at intervals as may be found necessary.

81. The line operators shall place on the back of the tickets the different reports received and sent, using the code as much as possible. The line operator shall advise the party calling, immediately upon their receipt, of all reports requiring further instructions from the party calling. Any other reports that are received shall not be made to the party calling, except upon request or at the time of releasing the subscriber's line.

82. If the party called for cannot be located in the city or town given on the ticket, the line operator, when requested to do so, will agree to attempt to locate the party called for in one or more cities or towns that the party calling may suggest, if the party calling will agree to talk with the party called for at whatever point he is located.

83. When the party calling is out and cannot be reached by telephone, the line operator shall leave word with the party answering the telephone of the party calling, to call long-distance by saying "When Mr. ———— (Name of party calling) returns, have him call ———— (Name of Telephone Company) long-distance operator ———— (Number of line operator's position)."

84. The line operator shall refer to the supervisor all calls on which there have been a delay of twenty minutes, and on which no definite report has been received from the distant office.

85. The line operator, unless specially instructed to do so by her superior, shall not look up in their exchange directories numbers of parties called for at distant offices. If the line operator knows the number of the party called for, she shall supply it and pass to distant operator.

RECEIVED CALLS.

86. The line operator shall answer all incoming signals on the toll lines by giving the name of her office. She shall then take the details of all calls as given by the distant operators. The line operator shall verify the details on the calls by repeating back each item to the distant office.

87. The line operator shall, as soon as the ticket has been copied and verified, proceed at once to obtain the party called for.

88. If the line operator can secure the party called for at once, she shall hold the toll line circuit, requesting the distant operator to do the same. As stated under "Sent Calls," the toll line circuit, if it is switched through one or more offices, is to be held for a period of five minutes unless reported on before.

89. The line operator, after having obtained the party called for, shall notify the distant operator that the party has been obtained, and after assuring herself that the toll line circuit is in suitable condition for the proposed connection, shall, when ordered to do so by the distant operator, connect the line of the party called for to the toll line circuit.

90. The line operator as soon as the conversation is started, shall cut out from the connection, noting the time of the connection on the ticket, and shall not cut in on the connection again unless signaled either by the subscriber or by the distant operator. If trouble comes in on a connection, it is expected that the line operator shall help make the necessary changes in the circuits, and stay in on the connection until the trouble has been removed.

91. The line operator, when signaled in on a connection, and finding that the conversation has apparently ceased, shall say "———— (Name of her station), are you waiting?" and allowing time for a reply, but receiving none, she shall say, "———— (Name of her station), are you through?" If no response is received, she shall at once take down the connection.

92. The line operators shall not time the length of conversation on "received" messages, unless specially instructed to do so by their supervisors.

93. The line operator, not being able to locate the party from the information given on the ticket, shall refer the ticket to the desk.

94. The line operator, upon finding that the line of the party called is "busy" or "don't answer," shall, after making two attempts to secure the party, refer the ticket to the desk.

95. The line operator, upon obtaining a report in connection with a ticket, shall pass the report to the distant office. If no report has already been made, some form of a report should be sent to the distant office at the end of fifteen minutes from the time the call was received.

96. When the party called for is found to be out, and cannot be reached by telephone, the line operator shall leave word with the party answering the telephone of the party called for, to call long-distance by saying, "When Mr. ———— (Name of party called for) returns, have him call ———— (Name of Telephone Company) long-distance operator ———— (Number of line operator's position)."

97. The line operator shall notify the desk of all "leave word" calls, giving the necessary details of the call to the desk operator.

98. The line operator shall look up in the telephone directory and supply all numbers of subscribers or firms that are not given in the distant office.

THROUGH CALLS.

99. Through or switching calls are divided into two classes, namely, "straight through" and "relay" switches.

100. A "straight through" switch is one on which the operator does not make any ticket or keep any record, unless specially instructed to do so by her supervisor, or when the circuit called for is busy, and the calling operator desires the through operator to notify her when the circuit desired is idle. In this case, no details of the call shall be taken, the through operator simply writing on a through ticket the points between which it is desired to make connection and on the back of the ticket the time and the code N. C. A through ticket of this kind would be called an N. C. switch.

101. A "relay" switch is one on which a record is kept, a regular through ticket being filled out with the necessary details. These calls shall be handled by the through operators in a manner similar to methods outlined under "sent" and "received" calls.

102. A line operator answering a signal on a toll line in the usual way and finding that a distant office desires connection with a toll line to another office, will immediately, if the line is idle and the call is to be treated as a straight through switch, put up the connection at her position, remaining cut in on the connection until the second office has answered.

103. The operator at the switching office shall now cut out from the connection and remain cut out until signaled in on the connection by one of the offices between which the connection has been established. The operator at the switching office will be justified in cutting in on a through connection if she has reason to believe that the circuits are being unnecessarily held. When it is necessary to cut in on a through connection, the operator shall listen first without battery, and if apparently the conversation has ceased, cut in with battery and say, "———— (Name of her station), are you waiting?" and allowing time for a reply and receiving none, shall say, "———— (Name of her station) are you through?" If no response is received, she shall take down the connection.

104. The greatest care should be exercised by switching or through operators in handling through connections, not to disturb them in any way until the operators are sure that the conversations have been finished.

105. If the line operator is unable to put up a through connection at her position, she shall obtain the name of the place called for and give the order to the through operator to complete the connection, as "———— (Name of place called for), for ———— (Name of place calling)." The through operator will then handle the call as already described.

106. When a line operator or a through operator in an office have instructions to handle the details of the through calls to the place called for, they shall take the details of the calls, verify them, pass them to the proper terminating or switching office, and handle, supervise, monitor, time, etc., the calls as already described under "sent" and "received" calls.

107. Through or switching calls should never be neglected by the line operators. They should be considered of equal importance with the "sent" and "received" calls and handled in the order they are received.

108. Orders or reports in connection with through or switching calls shall be handled in the same way as the original calls.

APPOINTMENT CALLS.

109. Appointment calls and those on which the patron desires to talk at a specified time.

110. When the line operator receives an "appointment" call from the recording operator, she shall pass the ticket to the receiving office, the same as a regular "sent" call, not allowing this to interfere, however, with any regular "sent" or "received" calls that may be waiting at the time. The operator at the terminating office, upon receiving the details of an appointment call from the sending office, shall ascertain if the party called for will talk at the appointed time and advise the sending office accordingly. In passing or receiving "appointment" calls, neither the toll line nor the line of the patron is to be held.

111. When there is a difference in the standard time between the two offices, the time at the office at which the appointment is made shall govern and the line operator shall call the attention of the party called for to this difference in time.

112. After an appointment has been accepted, both the operators at the terminating and originating offices shall notify the desk operators in their offices, who will, in each case, keep a record of the call, and five minutes before the time of appointment, notify the line operators, and the line operators shall take up the lines of their respective patrons and proceed to complete the call in sufficient season to enable conversation to be started as nearly the appointed time as possible.

COLLECT OR REVERSED CALLS.

113. Collect or reversed calls are those on which the charges are paid at the receiving office.

114. The name of the party calling is to be obtained on all "collect" or "reversed" calls.

115. When a "collect" or "reversed" call is received from a distant office by a line operator, she shall proceed to obtain the party called for. When the party called for has been obtained, she shall notify him that a certain party at a certain town or city desires to talk to him, and wishes him to pay for the message. If the party called for agrees to pay for the message, the line operator at the receiving office shall report to the line operator at the sending office that the call is "O. K., collect" and proceed to complete the call.

116. In completing the connection, in starting conversation, in monitoring and in supervising on "collect" messages, the duties of the line operators at the sending and receiving offices shall be reversed, the operator at the office at which the charge is to be paid being responsible for the connection.

117. If the party calling desires to have a message reversed after the conversation has been completed, the line operator shall refer the party calling to the chief operator, who shall reverse the message if it is agreeable to all parties concerned.

MESSENGER CALLS.

118. A "messenger" call is a call on which the services of a "messenger" is required in order to secure the party called for.

119. The line operator shall pass a "messenger" call the same as already described under "sent" and "received" calls, only the toll line and the line of the subscriber shall not be held.

120. The line operator at the receiving office upon receiving a "messenger" call, shall notify at once the desk operator, who shall send the messenger and notify the line operator of the nature of the report received. The line operator shall then pass the proper report, including the amount of the messenger charge, to the sending office.

121. When the connection is ready, the call shall be handled as already described under the "sent" and "received" calls.

PAY-STATION CALLS.

122. A pay-station call is a call terminating or originating at a public telephone.

123. Pay-station calls in general are handled the same as "sent" and "received" calls, as already described except in the matter of handling the collection of charges. On a call from a pay-station, the charges can be sent "collect" except when the party called for is at a second pay-station. In this case, the charges shall be collected from the originating pay-station. Exceptions can only be made to this rule by the chief operator.

124. In those offices where the pay-station lines end at toll sections with the multiple of all the toll lines within reach of the pay-station operator, this operator shall record and send all the calls originating from the pay-station telephones.

Calls received from distant offices for pay-stations will ordinarily be handled by the line operators receiving the calls. In some offices, all calls to and from the pay-stations will be handled at one position or section of the toll board.

125. If the pay-station has a regular attendant or clerk responsible for the telephone, the pay-station operator shall compute and give the amount of the charges so the attendant or clerk immediately at the end of the conversation.

126. If the pay-station is an automatic pay-station, the

operator shall have the patron deposit the proper amount for the initial period before completing the connection. At the same time the operator shall tell the patron that if he talks longer than the initial period, it will be necessary for her to interrupt him and ask him to deposit the proper amount for each additional minute that he may desire to talk. When the initial period has been completed, the operator shall go in on the connection and notify the patron that the time of the initial period has elapsed, and ask the patron to deposit the proper amount for any additional minutes that he may desire to talk.

REPEATING MESSAGES.

127. If the parties desire, a message may be repeated. The charge to be made for the connection will be determined by the supervisor.

128. Every effort should be made by the line operators to get the parties to talk with one another direct before repeating the message.

129. The repeating of messages should ordinarily be done at an office in the center of the line.

130. The repeating of messages is to be done, if practicable, by the desk operator, and not by the line operators.

LOST CALLS.

131. All calls not completed by midnight are to be canceled and considered lost calls for that day's business. The chief operator, on the following morning, shall take out from the previous day's tickets such lost calls as she thinks there is a possibility of reviving and make every effort to complete them. A record should be kept of all lost calls of a previous day's business that on any day are revived and completed.

132. A call that has been canceled can be tried again and put through at any time during a day's business if the party called for is obtained and if the party calling desires to have the connection completed.

133. Toll operators shall make every effort to complete calls before canceling them.

134. A call that has been canceled and is afterwards covered by another ticket, which is completed on the same day, shall be pinned to the second ticket and become a part of it and shall not be considered a lost call.

135. "Dead-head" calls that are lost shall be considered separate from the calls from the regular patrons.

136. All lost calls shall have the word "lost" stamped across their face.

CHARGES.

137. The rates to be charged on conversations are given in the rate book, and are for an initial period of three minutes and for each additional minute over the initial period. Day and night rates are given in the rate book. Three and one-fourth minutes shall be considered the same time as the initial period. Any fraction of a minute more than one-fourth shall be charged as an additional minute.

138. The change from day to night rate, and vice versa, shall be made at 6 o'clock p. m., and 6 o'clock a. m., respectively. A message beginning in the day period and extending into the night period shall be charged for at the day rate for the time of the initial period and the number of additional minutes consumed before 6 o'clock and at the night rate for the remaining minutes of the connection. For instance, a message beginning at 5:58 p. m. which is completed at 6:05 p. m., shall be charged as three minutes at the day rate, and four minutes at the night rate. The same rule shall govern from night to day rates.

139. A message should be charged to one of the two telephones between which the conversation is held. When a patron desires a charge transferred to a third telephone, the line operator shall refer the patron to the chief operator, who shall follow the instructions that have been given her for handling requests of this kind.

140. When a party is inaccessible by telephone, and a messenger is sent to his address notifying him to come to a pay-station, the expense of this messenger will usually be charged to the party calling. However, if the party calling will guarantee the charge, the messenger charge may be collected from the party called for, the charge being collected by the messenger.

141. The party calling shall in all cases when a messenger is necessary be charged the amount reported by the receiving office.

CODE SYMBOLS.

142. The code of symbols to be used are given in the following list:

A. B. Anyone who can talk business.
Apt. Appointment.
A. Y. Any one.
B. Y. Busy.
C. A. Cancel.
D. A. Did not answer.
E. K. Eastern time.
G. B. A. Give better address.
L. K. Telephone reached and looking for party.
L. W. Leave word.
M. G. Messenger.
N. C. No circuit available.
N. D. Absent—not expected to-day.
N. F. No telephone listed.
N. H. Not there.
N. R. No report to give.
U. Out Expected at ———— (time.)
U. D. Out. Do not know when the party will return.
U. N. Unknown.
W. H. We have.

GENERAL RULES AND REGULATIONS.

Visitors.—No person except officers and employes of this company whose duty brings them in connection with the switchboard will be allowed to enter the operating room except by special permission from the general manager. Neither the chief operator nor any of her subordinates shall be allowed to conduct visitors about the operating room.

Busy Trunks.—A record of the number of times all trunk lines between exchanges are reported busy will be maintained during the first week of every month and forwarded to the proper official.

Peg Counts.—Peg counts will be kept on the first and third Monday of each month. In computing lines and stations for peg count information, the number of subscribers' circuits in use on the switchboard shall constitute total number of lines, and the number of subscribers' telephones, extension sets, and stations connecting with private branch exchanges, shall constitute the total number of stations.

Service Complaints.—All verbal service complaints shall be made out on forms provided for that purpose. The telephone number, the date and time reported, and the name of the party who makes the complaint will be recorded. It will not be necessary to enter the subscriber's name or address on this report. The party taking the complaint will sign same in the lower right hand corner. If complaint is due to operating, it will be forwarded immediately to the chief operator. If it appears to be due to interference on a party line circuit or any other trouble caused by a subscriber, it will be forwarded to the complaint adjuster; and if due to mechanical trouble, it will be referred to the wire chief. Any criticism whatsoever of the service will be considered a complaint and so recorded.

Fire Drills.—The switchboard fire drill shall be held on the fourth Saturday of every month at the time when each division of operators go to lunch. The same rules as those employed for operators going off duty will be observed in the fire drill, with the single exception that the call bell will give three successive taps instead of one when operators are waiting for the signal to leave the room. The operators

then, instead of marching to the recreation room will move to and through the door leading to fire escape, thence down the fire escape to the floor below, where they will re-enter the building and march in order to the recreation room.

Emergency Lights.—In the event of a fuse blowing, or any other emergency occurring which would interfere with the lighting facilities in the operating room, the switch directly in the rear of the assistant chief operator's desk will be thrown, connecting an eight c. p. battery lamp over each section of the switchboard. This circuit works off the storage batteries and is to be used only in cases of emergency, as stated. The chief operator shall satisfy herself that all of her assistants understand the use of the switch and how to operate it.

Emergency Bell.—A call button located at the assistant chief operator's desk will operate a large single stroke gong in the wire chief's office and equipment department. The following signal code will be observed:

One tap will indicate that a switchboard man is wanted.

Two taps that a switchboard man is wanted immediately.

Five or more taps will be an alarm of fire.

In the event of a fire call, the various trouble clerks, line testers, etc., will proceed in order to the operating room, each one to his definite task as assigned him at the latest fire drill.

Damage to Plant.—In case of any emergency at night, such as fire, crossing of lines with conductors of high potential currents, damage by water, or any accident which would cause a suspension of the service or endanger the plant, the night watchman should be called at once, and also the first obtainable officer of a list, taken in order beginning with the exchange manager and ending with the general manager.

In case of any similar emergency at night on the outside, particularly where aerial wires or cables have broken down so as to endanger public safety, the night wire chief will be advised immediately. He in turn will communicate with the district inspector or trouble man living nearest to the location of such trouble, and the inspector after investigating will report his findings as soon as possible to the night wire chief by telephone. If it is deemed advisable the night wire chief will confer with the first obtainable officer beginning with the general foreman and ending with the general manager.

Chief Operators' Meeting.—The chief operator of each exchange and the supervisors and monitors of the central exchange will meet with the Central exchange manager at the latter's office on the first and third Thursdays of each month at 2 p. m., to discuss matters incident to and for the betterment of the general service.

Payroll.—The operating payroll should be in readiness not later than noon of the first and sixteenth day of each month, and the list of recommendations for changes in payroll should be delivered to the manager's office not later than the 20th of each month.

Applicants for Positions.—Applicants for the position of operator will be received at the office of the exchange manager every Thursday afternoon at two o'clock, where a committee composed of the chief operator and manager will interview and grade them according to their qualifications. Applicants of the higher grade, as determined by committee, will be sent for first, regardless of the date of their application. Written applications will be answered and applicants instructed to report at the time specified above.

Applicants should be selected according to the following requirements: First, perfect hearing and eyesight; second, they should be bright and quick of action; third, clear, pleasant voices; fourth, sound nerves and good general health; fifth, good character, as evidenced by recommendation.

Chief Operator.—The chief operator will be responsible to the manager for the service given by the office, both to other central offices and to the subscribers collectively and individually, during those hours in which the traffic is handled by the operators under her charge. She should have a thorough knowledge of the capacity and skill of every girl under her charge, in order that she may assign to each such operator the care of that position with which she is likely to make the best success.

If she is given authority as to the disposition and handling of the force is also expected to produce results; she is directly concerned in seeing that the standard of service is maintained at a proper level. It is to her that the manager looks to keep out complaints. She sees that the board is properly covered, and the operators are so arranged as to handle their work in the most efficient manner at all times and seasons. She discusses all complaints received regarding the service with the operator concerned, and she also takes the necessary precautions to prevent a repetition of the trouble.

She is expected to spend a certain portion of each day in listening in from the desk upon various operators to determine their efficiency.

She should see that no unauthorized persons are allowed in the operating room at any hour of the day or night and that no visitors or employes of other departments are permitted to interfere with the work of the operating force. She should familiarize herself with the names of the managers and chief operators of the different branch exchanges, so that matters pertaining to the service can be taken up personally with them.

She should see that the exchange clock is kept as nearly correct as possible, by conferring with the local authority on time.

She is responsible for the maintenance of proper discipline in the exchange and for the orderly and quiet behavior of the operators during business hours and while in the building.

Not only has she to give first-class service, to keep strict discipline, to set every one of her subordinates a definite task, and to see that that task is properly performed, but she has to settle all the little quarrels and grievances that spring up between the operators; to smooth out jealousies; to determine questions of responsibility; to look after those operators who are ill; to give concessions to this one and that without incurring any suspicion of partiality or causing any friction. Finally, she should have patience, good temper, ability to act at a moment's notice in an emergency, the faculty of never missing little things, the gift of inspiring confidence in her subordinates, and, last and best of all, diplomacy.

Assistant Chief Operator.—When the chief operator is present and in charge of the office, the assistant chief operator acts in the capacity of complaint adjuster. The work she is called upon to perform while thus employed, is practically examining into and determining the cause of the subscriber's verbal or written complaints of the service, and she will see that all verbal complaints are filled out on a form provided for that purpose. On the reverse side of such form record is made of irregularities found and the remedy applied.

After the cause of trouble has been located and removed, the adjuster will communicate with the subscriber and ascertain if he is experiencing any further trouble. If not, the slip will be filed for future reference in an open envelope, one of which has been provided for each line circuit, and arranged in numerical order.

On all complaints, whether received verbally or by mail, the adjuster will first determine from the complaint file the subscriber's past trouble, and be guided accordingly in adjusting latest case. In no event will a service complaint be filed until complaining party acknowledges the information that the matter reported has been adjusted to his satisfaction. The complaint adjuster will keep in touch with the

subscriber during the time the trouble is being investigated, and every assurance given him that his complaint is receiving due attention.

For the adjusting of party line complaints it has been decided to adopt as standard a maximum of sixty calls per day for a four-party line business circuit, or a total of fifteen calls per day for each subscriber, and a maximum of forty calls per day for a four-party line residence circuit, or a total of ten calls per day for each subscriber. On this basis, a two-party line subscriber will be allowed twice as many calls as a four-party line subscriber. Five minutes will be considered a maximum for a single conversation on any party line.

The complaint adjuster will also handle routine business between central offices; the verification of data regarding cutoffs; complaints of busy reports which subscribers have reason to doubt; questions regarding overcharges or disputes with operators on pay-station calls; reports from subscribers as to trouble on their line, etc. She will take charge of complaining subscribers who call for the manager, in the event of the latter's being busy, giving them the necessary explanations and assurances.

Complaints from subscribers should always be handled on the assumption that the subscriber's statements as to defective equipment or service are correct. This is necessary, not only as a matter of courtesy to the subscriber, but also to guard against a persistent recurrence of intermittent trouble. Cases of repeated complaints from the same subscriber should be referred to the manager, with recommendations for observing his service, so that same can be carefully watched until such time as the presence or absence of trouble is determined.

She shall verify the most important "Don't answer calls" or complete the connection if it is possible to do so. She shall be so located so as to be of easy access to the subscribers' catalogue, upon each card of which will be gathered data regarding the office hours of doctors, business houses, etc., so that she may be guided in *investigating complaints* of a *subscriber* who is unable to get the party he is calling. If it is discovered, and satisfactory explanation given, that telephone was not answered on account of no one being there, this will be ample assurance that there is no chronic condition in evidence on the line in question. If the card record shows that someone ought to be at the location of the party who is called, and subscriber calling insists that there is someone there to answer the telephone, the adjuster will report to the trouble department, and as soon as such department reports findings, she will get in communication with the complaining subscriber and inform him the circumstances of the case.

Her duties include the aiding of the chief operator, principally representing her at the desk, receiving complaints and calls for the chief operator.

She shall endeavor, as far as possible, to maintain the established order of things in its entirety, conforming in all respects to the method and system pursued by the chief operator. She shall have charge of the desk monitors and information clerks and see that the traffic through the desk is promptly and properly handled. In the event of any congestion she shall immediately call upon the chief operator for temporary relief, and be responsible to the chief operator for the entire desk service.

While having no ex-officio jurisdiction over the operating force, she exercises control over them in the absence of the chief operator, as her representative.

Floor Monitors.—The floor monitor has entire charge of the operators in her division, while they are on duty. She shall be responsible to the chief operator for the quality of the work performed by her division, while they are on duty, both in the case of individual operators, and considering the output of her particular squad in the aggregate.

It is her duty to keep complaints out of her division, to maintain as high a standard of service as possible at all times, and to superintend personally the work of each individual operator, coaching those who fall below the standard, reproving those who are careless or indifferent, and straightening out any little difficulties that may occur in the routine of their work.

She should keep all her operators under her observation, being continually on the alert for signs of trouble in any part of her division, and, if trouble should arise, she should cut in at once on the position of the operator concerned, helping her to get the connection or aiding her in whatever manner the occasion may demand.

She should see that all subscribers' calls are answered as quickly as possible and that the disconnection signals are given prompt attention. She should take occasion at intervals when she has opportunity, to listen in on her different operators, in order to assure herself that they are doing their work efficiently and in conformity with the rules; and should maintain as perfect a degree of discipline as possible upon all occasions. She should deal personally with all petty infringement of rules or faults in operating, but in case of any serious trouble, or of marked insubordination on the part of any operator, should at once bring the matter to the attention of the chief operator for settlement. While her authority over her operators is more curtailed than that of the chief operator, it is within certain limits quite as absolute, and she is invariably upheld by the chief operator, within these limits, in dealing with the employes constituting her division. She should be thoroughly interested and enthusiastic over her work, or she will never be able to instill interest or enthusiasm into her operators. She should be self-reliant in order that her operators may feel confidence in her, and should not run to the chief operator for advice and assistance in every little difficulty, as by so doing she will be more of a hindrance than a help. She should rather show a proper spirit of independence and a capacity to form her own judgment, in a pinch, without falling back upon someone else in every emergency. Far from leaning upon the chief operator, the monitors should afford her such firm and reliable support that she can occupy her proper position in the organization, which she must inevitably forfeit if she is to spend her time in bearing up their weaknesses, a state of things that must of necessity detract from her potential strength. A monitor should, without being unnecessarily strict, still hold herself so far aloof from her operators as to be able to make her authority felt at the proper time. She should not call an operator by her given name nor permit operators to use hers. This also applies to the workmen. Too much familiarity between a monitor and her operators always tends to undermine discipline, and to lead to irregularities. A monitor who does not respect herself can never command the respect of her division. She should be diplomatically impartial towards all her operators, while contriving to impress upon each individual in her division that she is her friend and will do all she can to help her. She should be painstaking and patient, as she will meet with many operators who will try these two qualities to the uttermost. Finally, while cultivating the art of seeing everything at once without appearing to do so, she should at the same time be discreet enough to occasionally be blind to some small irregularity. An operator whose soul is so vexed by being continually taken to task for minor faults, is apt to show her discouragement in the whole tone of her work, and the subscriber suffers accordingly.

She should be constantly on the alert for operators taking down connections improperly, releasing automatic ringing buttons, reporting the cord weights striking against the board, guarding against the plugging of lines, cautioning operators against speaking loudly or using improper expressions, seeing that operators hold cord until within a few inches of switchboard before allowing it to drop, and using

every precaution to avoid unnecessary noise. She should also see that the operators sit in the proper position.

She should see to it that the operators' sets are so adjusted as to give the best results, and at times ask the operators of her division to ring on the test bell in the same manner that she would on a subscriber's line; will note the duration of the ring, the interval between rings and the time which elapses before the operator reports, "They don't answer," on this test call. She should form her operators in line before the time for entering the switchboard room. She should see that the switchboard in her division is properly lighted, and cause the lamps used for illuminating purposes to be turned off when there is no occasion for them. She should not be allowed to leave her division until she arranges with her supervisors for relief.

She should rarely, if ever, enter into conversation with other monitors in such manner as to prevent her exercising continuous supervision of the service at her section of the board.

Senior Operators.—The senior operators are a division which bear the same relation to their monitor that the assistant chief operator does to the chief operator. She represents her when she is on relief or absent, taking her place in charge of a division, as well as her authority, for the time being. At other times she handles a position in common with other operators, being amenable to the orders of her monitor, as they are. She should be, as a general rule, the most expert and experienced operator in a division, and it is in her care that student operators are placed when they have progressed sufficiently to allow them to operate slowly, and until such time as they are able to correctly handle positions by themselves, under the eye of a monitor.

Information Clerks.—They shall give out numbers of subscribers who have been installed since the issue of the latest book, also changed numbers, disconnections, addresses, locations, etc. Anyone asking for a new subscriber's name which is not in the card record, and found to be in the latest book, will be asked whether or not he has a copy of such issue, so that a book can be forwarded to him. One of the latest books, corrected to date, will be maintained at her desk for the accommodation of those who, through some error, did not receive the latest book, also for the benefit of blind persons, parties calling from telephones which are located in dark places, etc. Information clerk should be very painstaking, courteous and exact in giving out information. Every possible precaution must be taken that parties have the right number.

Information clerks will not be permitted to hold arguments with the subscriber. If the subscriber desires to argue he should be immediately connected with the assistant chief operator. In connection with this the same rules which apply to operators in pronouncing numbers in a clear and distinct tone will be observed by the information clerk. Calls on information lines will be answered, "Information Clerk," and calls on monitored lines will be answered "What number are you calling?" If the information clerk does not understand the name given, on answering one of the information lines, she shall ask calling party to spell same, also be sure in each case to get location of party whose number is wanted, before giving out information.

Where a party insists that record is incorrect, every effort must be made to determine whether or not such is the case.

Exchange Clerk.—She is responsible for the central office records of every sort, and sees that they are kept up to date. She figures out the semi-monthly peg count returns, also the individual record of operators' standing, which is kept once a month, tabulates the files and test sheets, and keeps an accurate account of every line in the exchange district under its proper classification, whether it be a flat rate, measured rate, pay-station line, etc.

She receives from the engineering department a copy of each subscriber's order, covering all new lines, changes and disconnects, and on receiving an O. K. of same from the wire chief, enters same in the proper records.

She should see that a telephone number of a subscriber who has been cancelled, or has had number changed and old number appearing in latest directory, is not used for any other subscriber without being first passed upon by the exchange manager.

GENERAL OPERATING RULES.

Reporting for Duty.—Operators shall report for duty punctually at the hours designated by the chief operator.

Absence.—Operators who are ill or in any other way prevented from reporting for duty shall see that the chief operator is given notice at least one-half hour before the time at which they are due to report for duty.

Entering Operating Room.—At the first call bell in the operator's parlor, the operators shall go at once to the switchboard room, in the order of their positions at the switchboard.

At the second bell the operators at work shall arise and pass around the left side to the rear of their chairs, while the operators coming on duty shall be seated from the right side of the chair, and immediately insert their receiver plugs.

At the third bell the operators are relieved. They shall pass out in an orderly manner.

Testing for Cords.—Before reporting on any "Don't answer" operator shall test the cord used by ringing on the test bill in operating room.

Leaving Position.—Operators shall not change or leave their positions without permission from the chief operator, except for regular relief.

Handling of Plugs and Cords.—Plugs must be put in and taken out by holding the body of the plug, and in no case shall they be pushed in with the flat of the hand, or taken down by pulling the cord.

Operators shall make as little noise as possible in using apparatus, particularly when disconnecting, she shall hold plug until within a few inches of the board before letting it fall into its proper position.

Authorized Phrases.—Operators must confine themselves strictly to the phrases given in these rules, viz., "Number," "Line is busy," "I'll call them again," "They don't answer," etc.

Listening to Conversation.—In no case shall the operator listen on a subscriber's conversation more than is absolutely necessary to insure proper connection. On modern systems no listening whatever is necessary.

Proper Position.—She must sit in an upright position facing the board, and must not look around or pay any attention to visitors or others.

Reporting for Trouble.—She must report promptly to monitor every instance of line or switchboard trouble coming to her notice.

Busy Service Lines.—Operator must report promptly to monitor every instance where all the lines of any department of the company are all busy.

Giving Out Time.—A uniform method shall be observed by the operator in giving out the time to subscribers. In the event of a party asking for the time at 10:45 a. m., the operator should reply thus, "Ten forty-five," and not a "quarter of eleven."

Parties Saying Bell Rang.—If, on answering a line signal, subscriber states that his bell rang, operator will reply, "I don't know who called you." If subscriber is not satisfied with this statement, and desires further explanation, operator will say, "I will connect you with the chief operator," and do so at once.

Switchboard.—Operators shall keep the keyboard in a neat and tidy condition; the use of water, confectionery, fruit, books, etc., while on duty, is forbidden, and the

switchboard must be kept free from everything not required by the service.

Conversation.—Operators shall not indulge in conversation with each other at the switchboard.

Operators must be courteous in all their dealings with subscribers, but shall hold no conversation with them beyond that necessary in receiving calls and making connections. For any information or in case of difficulty, subscribers must be connected with the chief operator.

Under no circumstances must an operator give her name to any person over the line.

Deportment.—The fact of an operator being on relief anywhere in the building does not indicate that loud talking or boisterous conduct will be tolerated.

Operator's Set.—Each operator will be provided with an operator set for her individual use, and will be responsible to the chief operator for its condition. When an operator is off duty the set shall be placed as provided by chief operator's standing order.

Order Wire.—In handling trunk connections by means of the order wire, operators must listen after connecting themselves with the calling circuit by pressing the proper button, and under no circumstances interrupt an order which is being given.

Secrecy of Telephonic Communication.—All employes are forbidden to disclose or discuss any communication between users of the telephone. The attention of operators is called to the fact that there is a legal penalty for infringement of this rule.

Use of Instrument.—Operators must speak in a low, clear and distinct tone of voice directly into the transmitter, which should be so adjusted that the lips shall not be more than one-half inch distant from it. The receiver must be retained at the ear continually while the operator is at the switchboard.

Answering Calls.—Operators must answer all calls promptly, using cords beginning with the first pair on the left of her position and continuing in order to the right side of the position.

In replying to calls the operator shall use the single word, "Number," spoken with the rising inflection. The number given to operator, together with the exchange name, and letter, if any, shall be repeated to the calling subscriber sufficiently slowly to make it intelligible, and to give him a reasonable opportunity to make a correction. If the calling subscriber gives the number only, omitting the exchange name, she must not take it for granted that a local connection is wanted, but must, in every case, say, "What exchange?" In repeating back numbers operators should pronounce each figure of the number separately, thus: "Central seven-two-two-seven-W," for Central 7227-W.

Should a subscriber give the exchange name and number only and the operator observe when she is about to insert plug in the multiple that the jack is marked (indicating that same is a party line), she will say to subscriber, "That is a party line, what letter?" If this is not clear to calling party, operator will say, "I'll connect you with the information clerk," which she will accordingly do.

In the event of a party prefacing a number with the name of an exchange not connected with this company, the operator will say, "We have no such number, I'll connect you with the information clerk."

Busy Reports.—The answer, "Line busy," must be given to the subscriber calling only in the case of the called subscriber's line testing busy, and same shall be determined by the operator receiving a clicking sound in her telephone on tapping the rim of the jack of the number called for with the tip of her calling plug, or in the event of an outgoing trunk, the receiving of a busy back signal, indicated by the continuous flashing of the calling supervisory lamp. Care should be exercised on the former so as not to get out of order tone test (a shrill, humming sound) confused with the busy test. In no case must the report of "Line busy" be given for a trunk line, and in the event of all trunks to a branch exchange being engaged when a trunk connection is desired, the operator should report thus: "Crest lines are busy," "Lake lines are busy," or whatever the case may be.

When a line called for tests busy, and is enclosed with other jacks with a red line, the operator will test the remaining lines so enclosed and connect with one of them if possible, reporting "Lines are busy," only when all the series are in use. Except in the case of lines grouped as indicated in the above manner, operators shall not connect the subscriber with any other line than the one called for.

Out of Order Report.—The report "The line is out of order," shall be given in the same manner as set forth under heading of "Busy Report," except that the operator will receive a shrill, humming sound when tapping of the rim of the jack of the number called with the tip of her calling plug, instead of the busy test click. The same instructions given under "Busy Report" with reference to trunk and group lines will apply in the case of a line out of order.

Ringing.—If on tapping the rim of the jack of the number called for, a "busy" or "out of order" test is not received, the plug will be inserted in the jack, the listening cam closed and the called subscriber given one two-second ring.

Supervision.—If, after thirty seconds from the time the called party is rung, his supervisory signal remains lighted, showing that telephone has not been answered, she should throw her listening cam and say, "I'll call them again." The listening cam should then be closed, and the party called in manner heretofore set forth. In the event of the supervisory signal still remaining lit at the expiration of an additional thirty seconds, of one minute in all, the operator shall again ring in the manner heretofore prescribed, and if the subscriber has not answered thirty seconds after the second ring, or one and one-half minutes after first call was made, the operator shall report, "They don't answer," and should not ring again except at the subscriber's request.

If the supervisory signal of the subscriber who calls flashes before the called party answers, the operator will respond with "Number," and if the party calls for the same number and expresses impatience on account of the party whom he has called not answering, the operator will say, "I'm calling them." If the party who is calling hangs up the receiver before the party who is called answers, the operator will inform such called subscriber when he does answer, "The party who called you hung up their receiver," and if the party desires to know the number of the party who called, the operator will say, "I'll connect you with the chief operator." She will then change her cords so that the answering cord will be connected in the multiple with the party who was called and the calling cord with the chief operator. The operator will immediately inform the chief operator the line number of the party who called. In no case must the operator give out such information, as the person who called may be on a party line, and the party who would be given such number would, on calling same, invariably get the wrong party. The chief operator, however, after referring to subscriber's list, will give the party the information desired, unless the person who called happened to be a party line subscriber. Even in this case the chief operator will inform inquiring party the name of the different subscribers on the line, to enable him to select the one who would be most likely to call him.

In the event of the called party's supervisory signal flashing, with the other signal lit, showing that the party who called had hung up receiver, and party who was called requesting a number, operator will say, "Give this operator your number," and will immediately take down the connection, allowing line lamp to appear opposite the operator who generally answers his call. When both supervisory signals come in, the operator should immediately take down the

connection. The time required to disconnect should not, on the average, exceed the time required to answer the line signal.

In supervising an outgoing trunk call the operator on reporting to subscriber, "I'll call them again," will immediately switch on the order wire of the desired branch operator and request her to ring again on the number of the trunk which is being used, but where the equipment permits the originating "A" operator will be held responsible for the supervision and ringing of outgoing trunk connections.

By strictly complying with the above, subscribers who have been cut off during their conversation can, in most cases, be again connected. An operator who learns from a subscriber that he has been cut off shall endeavor at once to restore the connection. In the event of her being unable to do so, she shall immediately connect complaining party with the assistant chief operator.

In all cases where a subscriber is connected with the chief operator, manager, etc., operator should switch in in advance and give her superior the facts in the case in as few words as possible, so that they can talk intelligently and without making it necessary for the subscriber to repeat story.

In order that operators may have some means during the busy hour of knowing when to switch in on a connection and say, "I'll call them again," and also, that they may determine when sufficient time has elapsed to report, "They don't answer," the following rule on the handling of cords will be observed.

In a former rule headed "Answering Calls," you are instructed to use the cords in order as they come, beginning at the left hand side and continuing to the extreme right. Granting that in a busy hour about four connections are put up per minute, an operator can readily determine, by the number of cords up, just how long the supervisory signal of the party whom she is calling remains lighted. Such signal, therefore, remaining lighted on the second pair of cords to the left of the pair she is about to use, will indicate to her that thirty seconds have elapsed since the called party was rung, and she will proceed to ring them again. If the lamp still burns on the fourth pair of cords to the left of the pair she is about to use, it will be further indication to her that the sixty seconds are up, and she will ring the party again in the manner provided for in rules for ringing. In case of the calling supervisory signal remaining lighted on the sixth pair of cords to the left of the pair she is about to use, it will be indication to her that one and one-half minutes have elapsed and she shall report, "They don't answer."

In other than the busy hour, operators will have more of an opportunity to determine when these different periods have elapsed, and will, therefore, at such times, not be guided by this plan. However, the using of the cords in regular order will be maintained at all hours, as a more even wear on the cords is secured thereby.

Team Work.—All operators are required to assist one another, both in answering line signals and disconnecting, and in no case shall they be allowed to confine themselves to the answering of calls from lines terminating directly before them. Operators are therefore obligated to answer the first line signal operated in their vicinity.

In order to obtain the best possible team work among the operators it should be thoroughly understood that under no circumstances will any operator be allowed to plug out a line signal until she is able to answer the same as soon as plug is inserted.

Emergency Calls.—Anyone calling for the fire department will be connected with ————, even if this line tests busy, in which case the operator must not ring on the line. This rule will only apply to the fire department line.

Parties calling for the police department will be connected with ————.

Parties calling for a certain firm's ambulance will not be held up for the number, but operator will inquire of the monitor, who can furnish her with such information at once. In the case of a party calling for an ambulance and not giving the name of the ambulance wanted, the operator will say, "Whose ambulance do you want?" and will then proceed, on receiving information, in manner prescribed. In the event of party not knowing the name of the ambulance wanted, the monitor will be informed, and on determining the location of accident, the calling subscriber will be connected with the ambulance nearest to such location.

"B" or Trunk Operators.—"B" operators shall, in addition to the regular operating rules, observe the following:

She shall not preface the number of any trunk which she assigns with the word "on" or "put them on," or use any term whatsoever with the number of the trunk she assigns.

She shall, in assigning the number of a trunk, repeat each figure separately, thus: "Four-one."

If she does not understand the "A" operator asking for assignment, she will not assign the trunk, and her silence will be indication to the "A" operator that her request is not clear, and the assignment will be asked for again.

The monitor should be advised of any "A" operator, or the "A" operators of any particular exchange who insist on breaking in on the order wire without first listening to determine whether it is in use, or any interference which would result in the confusion or the delay of an assignment.

On incoming ring-down trunks the "B" operator will answer by giving the name of her exchange.

Monitors must immediately be notified in each case where an assignment has not been taken, also where subscribers are put on a different trunk from that assigned or put upon a trunk without any previous request for an assignment.

In the event of the operator discovering, after she has given out an assignment, that the "A" operator is calling for the wrong number, or the line which is called for is out of order (assuming that "B" operator has no listening-in keys at her position), she will plug the trunk assigned in on a special jack, which is connected with her set and get information necessary from subscribers to enable her to complete connection. In the event of her finding a line busy after assigning a trunk, she shall connect such trunk to one of the busy back jacks.

All trunks will be assigned at the incoming end only.

In asking for an assignment for a through trunk, say from Crest to Broad, for telephone number Broad 777 "A" operator will give out the call to central thus: "Crest-Broad 200."

"B" operators after giving an assignment will not ring party called for until subscriber's signal shows that "A" operator has put calling party on trunk assigned.

Pay-Station Operators.—In addition to the ordinary operating rules, the pay-station operators will observe the following:

She shall see that the proper amount is collected from each party as soon as calling supervisory lamp goes out, and before she completes the connection. The phrase used in collecting on local pay-stations will be "Drop nickel," or "Drop dime," as the case may be.

She shall, regardless as to who the calling party may be, allow only such free connections to number specified as are shown on her list of dead-head calls, and will be governed by similar list posted at her position of doctors' telephone numbers, to which free calls are allowed from certain pay-stations only.

Should she, in the course of her duties, notice or secure information which would lead her to believe that the code words, or any of the other privileges incident to pay-stations, are being abused, she shall report same to her monitor promptly.

In the case of a subscriber calling for a line which is busy, operators should, after reporting "Line busy," inform subscriber that she will call him as soon as line is disengaged, and after making note of the calling and the called number on a slip provided for that purpose, she will occasionally test the number desired and make connections as soon as it is possible for her to do so. This rule will only apply to pay-station subscribers.

Operators must give special attention to calls from pay stations, as they, being public telephones and frequently used by persons not familiar with their use, every effort must be made to aid such inexperienced customer in obtaining satisfactory connection.

Measured Service Operators.—Will be governed by the same rule as pay-station operators, except that the phrase, "Register," will be used instead of "Drop nickel."

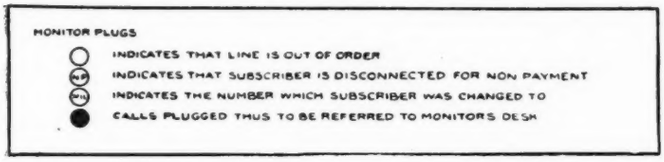

MONITOR PLUGS
INDICATES THAT LINE IS OUT OF ORDER
INDICATES THAT SUBSCRIBER IS DISCONNECTED FOR NON PAYMENT
INDICATES THE NUMBER WHICH SUBSCRIBER WAS CHANGED TO
CALLS PLUGGED THUS TO BE REFERRED TO MONITOR'S DESK

FIG. 1—STANDARD MONITOR PLUG SYMBOLS.

Switchboard Symbols.—The switchboard signals, as designated (Figs. 1, 2 and 3), need very little explanation, except that the pay-station toll device symbol is had by merely putting a protected opal over the lamp.

In small exchanges where an out-of-order tone test is not in use, a white plug should be used, which would be

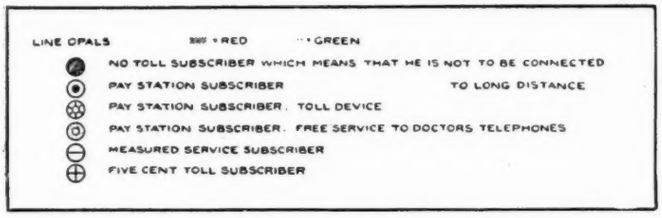

LINE OPALS
RED
GREEN
NO TOLL SUBSCRIBER WHICH MEANS THAT HE IS NOT TO BE CONNECTED
PAY STATION SUBSCRIBER
TO LONG DISTANCE
PAY STATION SUBSCRIBER. TOLL DEVICE
PAY STATION SUBSCRIBER. FREE SERVICE TO DOCTORS TELEPHONES
MEASURED SERVICE SUBSCRIBER
FIVE CENT TOLL SUBSCRIBER

FIG. 2—STANDARD LINE LAMP CAP SYMBOLS.

indication to the operator that the line is out of order. Also, where exchange is not large enough to warrant a desk monitor, a list will be posted on the board, and where instructions call for operator to refer call to monitor, operator will refer to list and give out information desired.

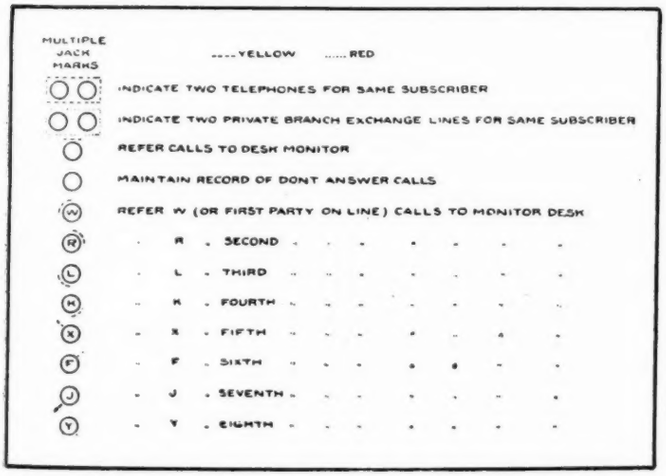

MULTIPLE JACK MARKS
YELLOW
RED
INDICATE TWO TELEPHONES FOR SAME SUBSCRIBER
INDICATE TWO PRIVATE BRANCH EXCHANGE LINES FOR SAME SUBSCRIBER
REFER CALLS TO DESK MONITOR
MAINTAIN RECORD OF DONT ANSWER CALLS
REFER W (OR FIRST PARTY ON LINE) CALLS TO MONITOR DESK
R . SECOND
L . THIRD
H . FOURTH
X . FIFTH
F . SIXTH
J . SEVENTH
Y . EIGHTH

FIG. 3—STANDARD MULTIPLE JACK SYMBOLS.

A yellow mark enclosing two or more multiple jacks will indicate that if the first line is busy, do not answer, or out of order, the second, third, etc., will be called in the order named. A red mark enclosing a number of lines will be handled the same as those enclosed in yellow, except that such lines enclosed in red are private branch exchange trunk lines and must not be rung when connection is first put up. If, however, at the end of thirty seconds, such P. B. X. calls have not been answered, operator will say "I'll call them again," and will then ring in the usual manner. A yellow mark over an individual line multiple jack indicates that subscriber is being called by mistake, or otherwise annoyed, and all calls will be referred to monitor desk or list, as the case may be, to determine the correctness of the call before same is made. A red mark over an individual multiple jack indicates that subscriber is having some trouble in getting his calls, and all don't answers on such lines should be immediately reported to the manager. On party lines where the number has been changed, telephone taken out, or is monitored for any other reason, calls for such numbers should be referred to the monitor desk, or switchboard list, and will be designated as follows: A yellow mark representing a quarter circle on the upper left-hand corner of the multiple jack indicates the first party on the circuit, etc. In magneto exchanges the same symbols as are used on line opals will be painted on the subscribers' drop, so that such symbols will plainly be seen when drop falls.

In case one or both cords of a pair become out of order a small rubber ring (a number of which should be located at each position) will be placed around the plug until such cord has been repaired.

ADMIRAL SCHLEY AT THE TELEPHONE.

Admiral Winfield Scott Schley is one of the most gallant of men. He is the perfection of old-fashioned politeness, a regular Lord Chesterfield of this hurrying, bustling age, when so few have time for politeness, says the New York Herald. The Admiral and Mrs. Schley returned to Washington some time ago and took up their abode in a modest hostelry which has been their home for many years. One evening the admiral was smoking in the lobby and swapping yarns with some old cronies when the clerk at the desk told him that someone wanted to speak to him over the telephone. He went to the instrument cigar in hand and his hat rakishly perched on one side.

His friends heard him say: "Yes, this is Admiral Schley; who is it speaking to me?" Then they saw the old salt spruce up, toss his cigar away and lift his hat high above his head. "Why, how do you do, Mrs. Green? I am very glad to speak to you and know you are well. Yes, Mrs. Schley is very well;" and then came a crossfire of questions about every member of the family collectively and individually, all the time the admiral, with his hat off, smiling and bowing at every word.

When he finished he was greeted with wild applause, and for some minutes he failed to see the joke. He felt it incumbent, he said, to throw away his cigar and take off his hat even when talking through the telephone to a lady. It appeared to the spectators the very essence of gallantry and on the same plane with the farmer's daughter who was so modest that she had to leave the room to change her mind.

CALL UPON STATE FOR HELP.

The resolution introduced into the Minnesota legislature by Representative S. D. Peterson, of New Ulm, Minnesota, directing the attorney-general to investigate the complaint of business men of Springfield, Minnesota, that unfair methods were used to destroy an Independent telephone line, was unanimously adopted by the House. The resolution alleges that a telephone system is maintaining a general store at Springfield, selling merchandise below cost, for the purpose of destroying the competition of Independent local rural lines and coercing the business men into patronizing the exchange and lines of the telephone system.

Digest of Telephone Patents

Conducted by Edward E. Clement

788,130—F. B. Cook. Combined Cable Head and Pole House.

This is a convenient and compact arrangement of protective apparatus, comprising lightning arresters and fuses mounted on opposite sides of the ordinary iron cable head, supported on brackets and housed in the case or shell *Z*. the sectional figure herewith shows part of the plan, looking downward. The cover *Z* is of sheet metal, with a conical top, and slides up and down on three supports, two of these marked *g-g* being of wood, and third *e*, being a grooved metal rod in which slides a spring *q* attached to the cover. The friction of the spring in the groove is sufficient to support the cover wherever it is placed, and a catch is provided at the upper end of the slide rod *e* to hold the cover when slid all the way up to expose the entire set of terminals.

The details of the apparatus hardly need explanation. The cable comes in from beneath as usual and passes up through the head *a*, *i* being the line terminals, *h* the fuses, and *j* the carbon lightning arresters. These are mounted in rows up the two sides and of course on the outside of the cable head, the metal covering enclosing the whole. A padlock is provided to lock the cover down on the circular base plate when desired.

There are seventeen claims in the patent.

792,601—W. S. Little. Sanitary Attachment or Speaking Tubes or Telephone Mouthpieces.

This is a cover for the open end of the mouthpiece, comprising a grooved ring over which is stretched a thin supplemental diaphragm of paper or the like, a clamping ring being sprung into the groove to hold the paper in place. The ring has spring clips or other means to hold it on the mouthpiece.

792,691—E. A. Buell. Telephony.

This is a selective party line scheme of the step by step variety, all other stations than those in use being at that time locked out. It is not intended that this lock-out shall be resorted to except where secrecy is desired. The principal point in the whole case seems to be that only a single magnet is required at each sub-station to perform the functions of stepping, locking, and restoring. The talking circuit at each sub-station, and in fact its entire local circuit, terminates in a pair of contacts closed as usual after a certain number of steps, this number differing at every station. Twin contacts are normally closed to line when the wheel is in zero position. The actuating magnet looks like a polarized ringer magnet, but is different in the following respects: that it has no magnetic yoke, but the magnets act separately, and the armature yoke has a longitudinal movement so that both ends of the armature can be pulled in at once and the working rod, corresponding to the ordinary clapper rod, can be thrown forward in a straight line. Thus, by putting current of one direction through both magnets, the armature can be tilted one way, by reversing it can be tilted the other way, and by putting it through both coils in the same direction, and in the proper direction, the entire armature can be drawn forward. The end of the rod carries two pawls, one stepping the wheel around and pivoted on the rod, the other a detent, pivoted on a fixed support and connected to the rod by a link whose end works in a slot in the rod. A cam on one side of the rod thrusts down a pin when the rod is thrown over, to lock the wheels.

In operation, the proper number of impulses is sent over both sides of the line to both magnets to reciprocate the armature and step forward the wheel. Current of proper direction is then sent to oscillate the armature and throw down the locking pins. Finally to restore, reverse current is sent to oscillate the armature in the opposite direction, which lifts the pawls out of engagement, and releases the locking pins, whereupon the tension springs return the wheels to zero.

This is the original application of Mr. Buell, and the six claims of the patent are directed to the combinations making up the system as such.

792,692—E. A. Buell. Electromagnetic Mechanism.

This is a division of the case last above noticed, the drawing and description being identical, but the claims in this case being directed to the magnetc mechanism itself, not confined to a telephone system. Claim 2 reads as follows:

"2. A circuit-changing mechanism including an electro-magnet having a circuit-controlling armature adapted to be oscillated and also to be bodily moved by the field of the magnet, substantially as described."

792,693.—E. A. Buell. Telephony.

This is another step by step selective schème for party lines, by Mr. Buell. The selective apparatus as the substations is of any desired type, the invention relating particularly to the transmitting apparatus at the central office. This transmitting device is supposed to be set to the number desired, sending out its impulses as it is set around, and then being held by a detent controlled by a magnet which is energized when the operator's master key is thrown over to its restoring position. The transmitting circuit is thus disconnected from the line while the sender is returning to its normal position, and the impulses do not get out on the line.

792,855—A. L. Sjoberg. Electric System.

The purpose of this invention is said to be to select any one of a series of stations from a central station and connect or close a local circuit at the selected station, for ringing bells, giving signals, operating motors or electric lights, telegraphing, telephoning or any of the uses to which the electric current can be put. The announcement sounds important, but the scheme disclosed does not appear to give much of a foundation for much grandiosity. It calls either for multiple line wires—four being shown—or for a step by step mechanism at each station with a multiplicity of magnets controlling the signalling circuit. The whole thing in a nut shell is simply this, that by taking four wires and four switches in a local circuit, various combinations can be sent to select a particular station and leaves all others open. Thus the switches might be set so that the combination for station 1 would be one impulse over line 1, the others being normally closed; for station 2, a similar impulse over line 2; for station 3, an impulse over line wires 2 and 3, and the like. By making combinations of the line wires many stations can be localized, but unfortunately for the scheme we are looking for simplicity in telephony, not complication, and this is not the first time a combination of the kind has been proposed.

792,892—G. M. Gest. System and Means for Laying Electrical Wires in Conduits.

This invention sets forth spacing disks with holes through them, preferably made of porcelain or glass, which are perforated and bare wires run through them, the disks coming at such short intervals that they keep the wires apart in the conduit. The disks are put on the wires and the same drawn into the ducts the same as usual.

792,927—D. A. Reynolds. Telephone Transmitter.

This is a transmitter of the double chamber type, exemplified in the Wilhelm and other instruments. The two halves of the casing are chambered, a diaphragm is laid over each chamber, having a central electrode face covering the same, a felt ring being interposed under the diaphragm and around each cell. Overlying each diaphragm is a perforated cap having a central opening, and these two openings are connected into one tube or flue terminating at the mouthpiece *22*. Around each chamber, and secured to the shell around an annular depression therein, are a series of dampers, comprising flat springs with the usual rubber-covered ends bearing on the diaphragms.

793,325—A. Stiles. Noise and Lightning Arrester for Telephone Wires.

This is an improvement over a device patented by Mr. Stiles August 11, 1903, No. 735,839. In the present case he uses phosphor-bronze to form a spring jack, the soft copper to form a plug. The spring jack *C* is tied to one end of the line *A* by having the end taken through an eye and twisted. The tail of the plug is secured to the other end *B* in the same way. When the plug is pulled out of the jack and the line is broken, and this may be done outside of a building containing a telephone, so as to prevent damage by lightning.

793,389—F. R. McBerty and J. L. McQuarrie. Telephone Service Meter.

This is one of that type of registers in which a Veeder meter is employed, adapted to work forwards or backwards, with a magnet to step it one way or the other. The magnet is polarized, and the register is located at the subscriber's station. When the operator in answer to a call inserts a plug, the normal battery current in the answering end of her cord circuit is of proper direction to step the meter forward one step. If the connection wanted is obtained, this is permitted to remain; if not, the operator works a suitable key to reverse the current on the calling line, thereby reversely working the meter, and rebating the charge.

The arrangement of the register magnet at the sub-station is rather ingenious. The tilting armature is pivoted between the magnet poles, has a considerable movement, and carries two pawls pivoted at its opposite ends and acting oppositely on the pinion of the meter. When either end of the armature is attracted its pawl steps around the meter in its own direction, while the other pawl is simultaneously thrown out by a fixed pin against which a cam face on the pawl bears. By simply reversing current through the magnet therefore the meter can be stepped one way or the other.

In the diagram *1* is the reverse key, which is depressed just before the plug is pulled out. It should be stated that the meter does not respond to ringing current. The resistance of the ringer and that of the meter may be such that the latter will be shunted by the former.

793,436—P. C. Green. Earpiece or Acoustic Device.

This is a teat stuck in the middle of the cap of a receiver to enter the opening of the ear, and so convey the sound directly into the proper channel. The teat has side perforations "in order to permit circulation and prevent condensation."

793,444—K. Holflinger. Microtelephone.

This is a combined microphone, push button and receiver, all stuck together as in the old Ader telephone. The instrument is really combined in this case, however, the receiver, which is of the usual watch case type, being in the front of the shell, and the microphone, which contains a carbon block full of granular carbon with a diaphragm held down on it, lies in the bottom of the shell, the space between the transmitter diaphragm having its walls perforated, so that, as the patentee says, "the sound waves may be transmitted both by the air and by the bones of the skull" to the microphone. A push button is in the microphone shell on one side, normally completing the signaling circuit, but held in to close the microphone circuit during conversation, this taking the place of the ordinary switch-hook. Another push button in the back of the shell projects somewhat therefrom, and with two fixed legs on the shell supports the instrument when not in use. To call, the hand is laid heavily upon the shell, pushing in this button to ring over the line.

793,541.—L. F. Rose. Electrical Annunciator.

The person who prepared the application for this patent is as well fitted for handling telephone cases as the devil is for saying mass. The invention is apparently a combined drop and jack of the express or self-restoring type. The drop is shown at *11*, and is carried on a U-shaped yoke pivoted at the side of the controlling magnet, the ends being fitted with counterbalance weights, and the front under the drop shutter having a cam which falls behind the jack opening so that when a plug is inserted it will restore the shutter.

793,563—C. A. Brown. Thermal Cut-Out or Circuit Changer.

This is that Mr. Brown formerly of the firm of Barton & Brown, now attorney for the Stromberg-Carlson Telephone Company. The present application was filed April 5, 1902. The basic idea of the invention is to keep the solder out of the circuit through a heat coil. This is accomplished by putting a head on the coil in the shape of a button which holds up one line spring and keeps it in contact with a fixed terminal as long as the device is cool. Undue heat lets the button fly off, whereupon the spring opens the circuit, and if necessary, grounds one side of it. The claims seem to be tolerably broad, and there are eighteen of them.

793,578—C. E. Frederickson. Electrical Signaling System.

This is another step by step selective device for party lines, or rather for any old purpose requiring selection. The disk *A* at the right of the figure is at the sending station, while the disk *8* on the left is at the receiving station, or one of them. These disks are of insulation, and all the parts are shown in their normal positions. Suppose it is desired to call one of the stations, the pole changing switch at *O* at central is thrown to the left, putting battery from ground to the switch *D* and so through the line wire *1* out to the sub-stations and at each through magnet *2* to the ground. The handle *k* is then turned at central to revolve the switch arm which passes over the line contacts sending makes and breaks. For each make the magnet *2* pulls up its armature, throws over the arm *4* of the bell crank lever, pulls the bar *6* and by its pawl *7* draws the disk *8* around one tooth. More than one tooth is impossible, because at each stroke the dog *11* has its toe thrust between the two succeeding teeth. The contact *14* is allowed to trail around the teeth as they turn, until the strip *19* of con-

ducting material makes contact and closes the circuit of the bell.

When the connection is made, the switch *O* is shifted to the right, sending current over the other line wire to ring the bell *28*, and also to energize the release magnet *29*, which pulls up its armature so that the pivoted dog *33* will come under the toe *17* of the pawl lever *6*. To restore the device current is cut off by placing the switch in a neutral position as shown. The magnet *29* then lets go, and as its armature drops the dog *33* lifts the lever *6* with both pawls *7* and *14*, and permits the weight *22*, which is geared to the shaft of the disk *H* to run down and return the disk to its zero or normal position.

793,603—F. R. McBerty and J. L. McQuarrie. Service Meter.

This is the same service meter referred to in patent No. 793,389, hereinbefore noticed. The claims of this patent deal with the structure of the meter. The same consists of a U-shaped frame *b*, of steel permanently polarized, and a swinging armature *d* pivoted between the ends thereof, while two magnets *a-a* are housed within it. Upon the front end is a casing containing the Veeder meter to which reference has been made, and closed by a cap with a sight opening or window in its end.

Both these patents are assigned to the Western Electric Company of Chicago.

793,802.—F. R. Parker. Electric Protective Apparatus.

This patent is assigned to Frank B. Cook of Chicago, and relates to the Cook frame and protective devices, as is sufficiently apparent at a glance. In the figures herewith, *A* is a metal strip formed up of sheet metal in two halves, the edges taking the carbon arrester blocks *P*, and the sides supporting the springs of the heat coils. The latter are of the rotary self-soldering type, and need no specific description.

In the second figure herewith a test plug is shown straddling the arresters, its springs D^2 making contact with the side springs of the line, and other of its springs spreading and touching the other springs of the prospective strip. The circuits of the plug lead to test apparatus, and the device enables a very convenient manipulation to be had.

There are forty-two claims, many of them broad, and many of them relating to details of the apparatus of which space limits forbid mention.

793,826—N. Damico. Telephone Attachment.

This is a clip *4*, having a ring-shaped extension *1*, and a tongue 5. The ring is screwed on under the mouthpiece of the transmitter and the tongue holds a card for memoranda or names, or the like.

793,845—F. B. Long. Automatic Take-Up Device for Telephone Connections.

This is Frank Benajah Long of Los Angeles, California, and his invention is a reel to wind up flexible conductors, ordinarily called cords. The cords pass to and through the hub of a spring drum, then around it, and out to the receiver or whatever is to be attached to them. The cords are preferably made up in a flat web, and the operation is precisely the same as that of an ordinary house-wife's tape measure. When you pull it unwinds, and when you let go it winds up.

793,028—W. E. Harkness. Telephone Transmitter.

This patent is assigned to the Dean Electric Company of Elyria, Ohio, and signalizes the advent of what is probably the best transmitter to-day, i. e., the Dean transmitter. This should not be confounded with the Kellogg transmitter, which was also designed by Mr. Dean, but which he has improved wonderfully. In the Kellog transmitter, which was at one time the best of its class, the aluminum diaphragm is formed up at its center to have a forwardly extending cup, the electrodes being seated in this cup and secured to the diaphragm. Several benefits have flowed from this arrangement, not the least of which was the directness of application of the sound waves to the walls of the resistance chamber. Several disadvantages were discovered, however, and these have been corrected in the Dean Company's instrument. In the first place, the production of the Kellog diaphragm is expensive, and the distribution of the metal after forming up is not as good as it should be. In the Dean instrument, one feature of which is covered in the present patent, the diaphragm is centrally perforated, with a flange formed up around the hole, and the resistance chamber is made entirely separate, in the shape of a flanged cup, the cup being closed by the usual mica diaphragm and carried bodily on a stud *e'* set in the bridge. A pair of springs resting on the flange of the cup hold it against the diaphragm so that it will vibrate with the latter without being supported upon it. The bottom of the cup being directly exposed to the outside air, takes up all the fine overtones, and since the cup is made separately as a small piece, it can be made more exactly and the metal distributed precisely as it should be.

793,941—Edmund Land. Telephone Exchange System.

This is one of the inventions of Mr. Land of Grand Rapids, and is assigned to the Stromberg-Carlson Company. The objects of the invention are to simplify the cut-off to provide a simple test circuit.

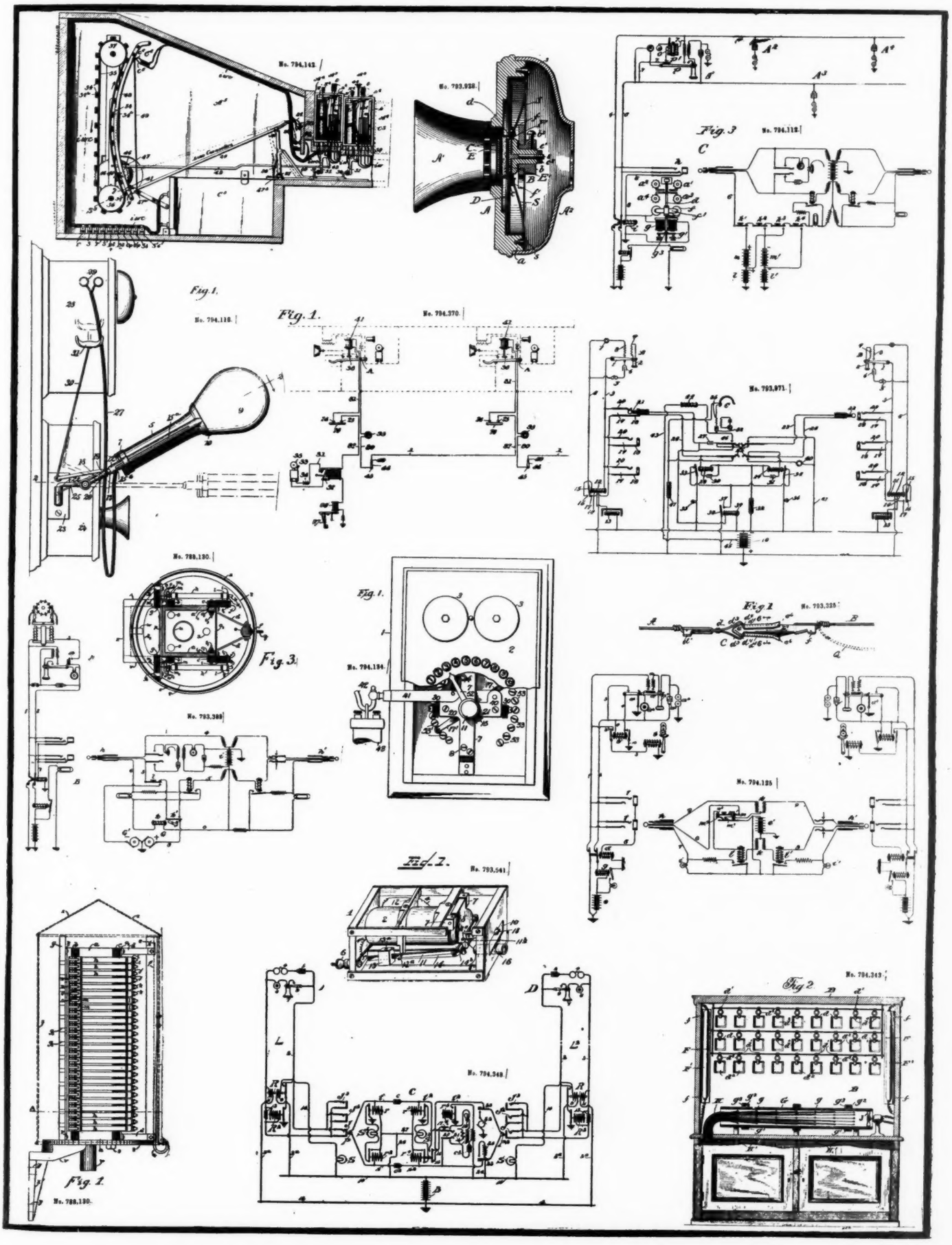
The line signal magnet is controlled by a differential cut-off relay whose windings are serially included between the tip side of the line and the battery. When the subscriber closes the circuit in calling, the line signal is energized but not the cut-off; but when the answering plug is inserted a circuit of low resistance is immediately closed through one winding and the cord, whereupon the magnet becomes unbalanced and acts to cut off the line signal. In order to avoid talking through the cut-off relay a short circuit for the tip side is closed when its armature is attracted.

The test is as follows: The calling plug tip *26* is to negative battery through *41, 39* and supervisory lamp *35;* when a line is busy its cut-off relay will have connected the sleeve side of line to the jack thimbles, these being normally disconnected, thereby giving them current from the transmitter supply. Since the supervisory relay coil is between the negative side of battery and the jack thimbles, when a plug is inserted there is a difference in potential between the thimble of the busy line and the tip of a calling plug, which, upon contact in testing, causes a partial discharge of a condenser *32*, producing the characteristic click.

793,971—H. G. Webster. Telephone Exchange System.

This is also assigned to the Stromberg-Carlson Telephone Company, and like the Land case, relates to a two-wire multiple system. The invention relates to test circuits, and is intended to furnish a reliable test with only a very slight difference in potential between the tip of the calling plug and the jack thimble. In order to give certainty, the jack thimbles are normally cut off, and are only connected to line and battery when a plug is inserted. This is attained by having a differential cut-off relay normally included in the line with the line signal. When a plug is inserted a low resistance path is closed through one winding of the cut-off, the line signal and the other winding are disconnected, and the line is put on to the jack thimble.

In order to secure a slight difference of potential, the operator's set is connected to a point intermediate of the battery terminals.



793,972—H. G. Webster. Telephone Exchange System.

This is the third patent of the group assigned to the Stromberg-Carlson Company. It also relates to test circuits, and has for its object to reduce the potential to which the operator's set is exposed in testing. The jack thimbles, as stated in connection with the other cases are cut off from the line when not in use, and in order to cut down the potential as stated between the thimbles as connected and the testing tip, a resistance *43-44* is bridged across the battery, and the return wire from the operator's testing set is connected to an intermediate point on this resistance.

794,016—F. F. Howe. Telephone Attachment.

This is a receiver support comprising a brace *A* fixed to the wall and carrying the pivoted bracket *B* upon which the receiver is fixed, being normally thrown to the right by a coiled spring. In such position the bracket arm rests on a cam lever *O*, whose end is attached to the hook switch through a rod. When the ear is pressed against the receiver and the pressure is taken off this pivoted cam lever, the lever and the hook switch both rise. When the receiver swings again to the right the hook is again depressed.

794,112—J. L. McQuarrie. Service Meter for Party Telephone Lines.

This patent is assigned to the Western Electric Company, and covers a somewhat important invention. It presents a scheme for a party line meter, the operator being provided with four keys, and the arrangement being such that any one of four registers may be worked according to which key is depressed. Each party's call can therefore be charged up against him.

The register structure comprises a base and four register movements mounted on it, with a rock shaft extending along between them and having oppositely projecting fingers by which it engages and moves a register on one side or the other according to the direction in which it is rocked. The registers may be said to be in two pairs, and the rock shaft has a longitudinal movement by which it may be brought into operative relation with either pair, when by rocking it either one way or the other one register of that pair can be worked. In the figure herewith *d* is the rock shaft, moved lengthwise by the magnet *g* so as to bring its fingers opposite one pair a'-a^2 of the registers, or the other a^3-a^4. *f* is the rocking magnet, which is built like a polarized ringer, and rocks the shaft according to the polarity of current through it so as to work one or the other of the registers of the pairs already selected. These two magnets are in parallel with the cut-off relay *i*, which takes current through the third conductor *6* of the cord when a plug is in. The registering keys are shown at *k'-k2-k3-k4*, *k'* and *k3* sending respectively strong and weak positive current over the wire *6*, while *k2-k4* send respective strong and weak negative current. Strong current works both magnets *f* and *g*, while weak current of either polarity rocks the shaft of magnet *f* without reciprocating it. Each of these four keys will therefore work a different register.

In order to tell which party on a line is calling the patentee puts a special bell with a distinctive tone at each sub-station. In plugging in to get the number the operator listens to the tone of the bell and presses the corresponding key.

794,116.—V. Rebhun. Telephone Attachment.

This is a receiver holder, which also carries a resonator or sound chamber, which not only acts, or is intended to act, to augment the sounds, but encloses the ear of the user and shuts out disturbing sounds. This device comprises a base plate *23* attached to one side of the backboard or casing of the telephone, a horizontal short arm pivoted on this plate at *22*, a telescopic holder *12*, which carries the receiver in a direct line, or at right angles to the usual position, and the resonator, which is a hard-rubber gourd-shaped article with one side open so that it can be held over the ear. The receiver forms the neck or stem of the gourd, and the sounds produced by the receiver in the chamber are supposed to resound in the ear so as to give great apparent volume. The inner or pivot end of the holder carries an arm *18* connected by a rod *30* to the ordinary switch-hook, and when the receiver is in use the telescopic joints are pulled out so that the leverage is increased, the weight of the receiver then sufficing to push up the hook against the force of a special spring *25*. When the receiver is out of use it is pushed in and the arm becoming shorter the leverage is decreased so that the spring overcomes the weight and pulls down the hook.

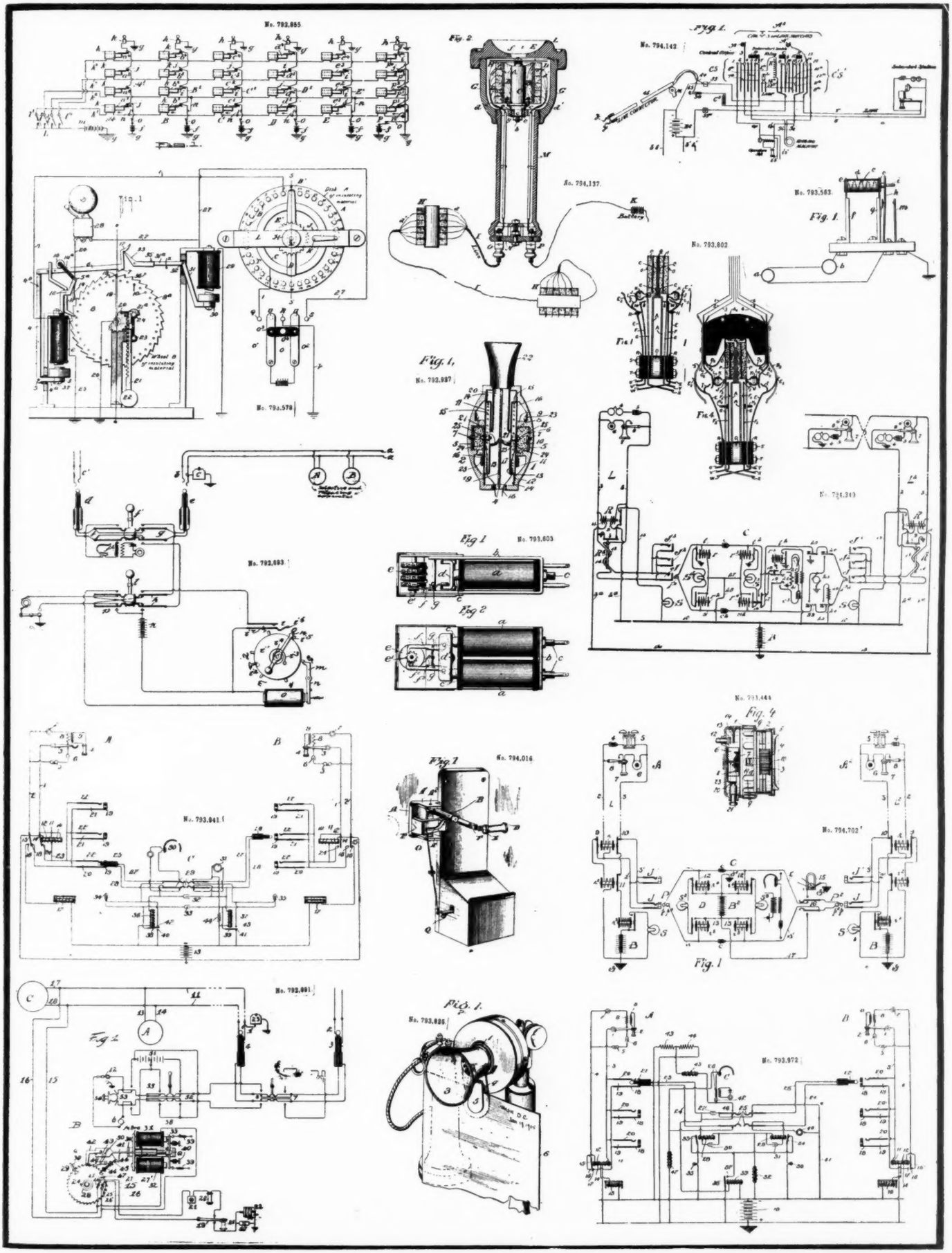
794,125—C. E. Scribner and J. L. McQuarrie. Service Meter for Telephone Lines.

This is a scheme for registering completed connections only, the register being at the subscriber's station and the control exercised by the operator through a special key. Each subscriber's switchhook has a special contact closed for an instant to ground the sleeve side of line when the hook goes down on hanging up the receiver after a conversation. In the branch from the sleeve side to the hook is a special relay having a self-locking contact so that when once energized it will hold up until the battery is taken off, and a register contact which when so energized connects the register magnet to the tip side of line, this being the normally grounded or "dead" side. After the subscribers are through talking and hang up, each automatically grounds the sleeve side of his line, *2*, whereupon his relay *b'* pulls up, locks itself upon by ground *10*, and puts the register magnet *b* on the tip side of line at *b2*. The operator then, before pulling the plugs, depresses the key *m* in the answering end of the cord, thereby putting the live side of battery to the tip side of the line, and breaking the sleeve side at *m2* as long as the key is down. Battery on the tip side works the register of the calling party, and the breaking of the sleeve side of each line cuts off the relays *b'*, all parts then being again normal and the plugs ready to be removed as usual.

The circuits and apparatus are the standard relay type of the Bell and Western Electric, the latter company being the assignee.

794,134—K. Weman and H. M. Bascom. Telephone Switch.

This is a scheme for intercommunicating systems whereby the switch may be left turned to any station, but the hook lever will upon hanging up put the receiving apparatus in condition for receiving calls. In other words, instead of a flyback switch, this is a disconnecting switch. A circular series of fixed contacts is provided at each station for all the stations, and from each contact an individual wire passes to the appropriate station and to a corresponding contact in the switch at every other station. The switch proper comprises a spindle carrying a set of radial springs to make contact with these fixed contacts, and a sleeve fixed on the spindle to shift two sets of ringing and talking springs. The hand is first set around to the desired number on the dial, thereby turning the spindle until its springs come over the appropriate contacts of the fixed set, then the spindle, which carries a button on the outside end, is pushed in to call. This brings the terminal springs down onto the line contacts and also by the aforesaid sleeve cuts off the talking circuit and puts generator to the line selected. When through ringing the button is released and the spindle partly retracts, being prevented from fully doing so, however, by a detent, which catches



behind the collar or sleeve referred to. This partial retraction opens the generator circuit and closes the talking circuit. When through talking, the receiver is hung up, whereupon a dog on the hook lever comes down on the detent which holds the spindle in, and releases it, whereupon the spindle fully retracts so as to lift its contact springs off the line contacts. The same movement again closes the local ringer circuit and all parts are again normal. The switch can thus be left at any position, being lifted off the contacts of other lines.

794,137—T. C. Brecht. Telephone Receiver.

This is one of those visionary and freakish productions which were commonly much more common than now. The mere fact of a thing being different is no reason in itself for disputing its efficiency or right to exist, but when no good reason is alleged even by the parent for his progeny, then perfunctory dismissal is justifiable. An iron core, a wooden cylinder around that, an iron cylinder around that, and a number of coils in multiple around the outside of this singular agglomeration, with finally a diaphragm fastened by its centre to the top of the iron core, make a receiver that is as harmless as it appears fantastic, and which will doubtless prove as innocuous as the patent covering it.

794,142—E. Darnell. Telephone Switchboard.

This is a very interesting case indeed. It is not the first time an attempt has been made to apply typewriter movements and mechanical principles to a telephone system, so as to do away with the troublesome and expensive cords and plugs. Most of us have dreamed of some delightfully novel and simple combination of levers and switches whereby the operator would not have to watch a lot of line lamps and stick plugs, but when a subscriber called he would automatically get on her circuit in some way and she would punch a couple of keys and the thing would be done. But unfortunately the thing which looks easy and simple with a few lines becomes horribly complicated and expensive when those few are multiplied by hundreds or thousands, and so we most of us have turned to other fields for something more commercially attractive. Results are what the present investor and constructor seek. Experiments are not welcome unless they can be shown to rest on sure foundations. The first question that is asked is: "Can it do all that the present highly developed systems and switchboards do?" The second question is: "What will it cost to build for 100, 500, 1,000, 5,000 and 10,000 lines?" And the last and almost the most important question is: "What will the cost of operation be, and what is the depreciation factor?"

If any one of these questions can not be answered shortly, sharply and satisfactorily, there is no use in going farther. It is with the first question, moreover, like Calve's rumored divorce—there were seven reasons against it, the first being that she had no husband, and the others being immaterial. If the first question can not be answered, the others need no be asked. Now, this first question is a tickler. I am far from desiring to discourage any who are courageously attacking the problems we have yet before us, and in fact after years of experience in the patent field and as an engineer and manufacturer, I feel keenly that it is those who do not make successes who often are directly responsible for the great things that come as boons to the world. The men who come to us for advice and to get protection from the government often have not solved the problems they have attacked, but their earnest efforts have the dignity that earnestness in anything confers, and not only often point out paths to avoid, but actually bear within themselves the hints of the paths to success, and in this way they confer upon their projectors the honor of attaining victory even in defeat. No man who attacks a problem and gives of his best thought and his best endeavor to solve it, ought to be unduly criticised, but treated with respect, and so I hope no remarks in this digest will ever be taken as any more than what they are intended to be, *i. e.*, the contributions of an earnest observer of earnest workers.

I am unable to say without study that this invention will prove commercially practicable, but I feel sure that if it does not, the man who can make such a good first attempt will make a better second one, and such men should be encouraged.

The idea is to have each line terminate in a swinging tubular arm with end spring jaws which may be pushed forward by the operator to close on a cross-bar. When two pairs of jaws have been pushed forward on the same bar the two lines are connected through that bar. Now, in order to use a set of line terminals side by side, and be able to connect several of them at once, a multiple set of parallel cross-bars are provided, indication at *34* and *34a* in Fig. 2 herewith, carried on an endless belt which is moved up one step by the operator through a lever like a typewriter space bar, for each connection. Successive pairs of arms *26* may thus be connected, each pair swinging up with its connecting bar until the space shown as an arc is full, when the top pair is thrown off, and so on.

At the front end of the bars, a set of subscribers' line lamps and keys are mounted. Each is mounted in a separate case, like a ringing and listening key on the present switchboards, and each has springs so arranged that by manipulating the lever the circuits may be changed to listen in, ring, and connect. The subscribers clear out themselves by releasing their levers *26* when they hang, their relays then tripping and the springs *28* forcing the carrying levers back, whereupon the swinging levers or tubular arms *26* drop into normal resting position, being guided by wire guides.

The virtues of the apparatus are easily comprehended, and the patent is well worth reading, being clearly written up and the drawings apparently made from a working apparatus, so that any man familiar with telephone apparatus can understand the figures at a glance. The patentee's statement of valuable features is as follows:

The leading features of my invention are—

First, the principle of substituting a connector apparatus in place of cords, plugs, and jacks, thereby enabling the operator by means of switch levers to establish connection between subscribers.

Second, the ending of each subscriber's line in a movable connector, all connectors of each section of switchboard being arranged in parallel lines and in the same plane, and providing bridge-strips which may successively be brought to a position at right angles to the lines occupied by connectors and in this same plane and successively passed out of this position after two or more connectors have been moved into engagement with a strip.

Third, by requiring fewer and easier motions upon the part of the operator in establishing a connection between subscribers and no motions or work in disconnection of same I claim an operator may handle a greater number of subscribers than by present systems.

Fourth, by placing the disconnection within the power of the subscriber this will allow him to signal central for immediately succeeding calls with the same dispatch as the first, inasmuch as he does not wait for operator to disconnect him.

Fifth, by grouping the different parts of each subscriber's equipment, which are liable to become deranged, into separate units interchangeable with every other subscriber's equipment these units are easily and quickly removed from the board and others substituted for them.

Sixth, absolutely secret service.

Seventh, providing a practical trunk system for extending my invention.

Eighth, adjusting a red screen over the lamp to make one lamp display two separate signals for the purpose described.

794,343—M. C. Burt. Telephone Switchboard.

This is a switchboard lighted up within by a common lamp, Cooper-Hewitt mercury vapor lamps being shown, the signals being swinging shutters, which close openings through which the light can emerge to smite the eye of

the operator. The inventor is solicitous about the dust and vermin getting in the cable and wire ends, so he puts an electric fan *J* in the end of the cable, distributing sheath to blow into the bunch of wires and keep them well ventilated.

794,348—W. W. Dean. Telephone System.

This patent is assigned to the Kellogg Switchboard and Supply Company, and is based on one of a group of inventions made by the prolific Mr. Dean while connected with that company, intended to cover up all possible forms of two-wire multiple common-battery systems, with or without cut-off relays. How successful the company has been in this ambition, which may have been all right while it was Independent, but is likely to be vigorously objected to now, is entirely problematical. There are several others making two-wire systems.

In the present case the line relay is divided as to its windings, and the main battery is connected between the divisions. This bridges the relay and battery, while the ends of the line are then taken to the jack tip and sleeve, with a cut-off relay inside. This relay is shunted by a non-inductive resistance so as not to cut down the talking efficiency. The cord circuit has the familiar two relays controlling the supervisory lamp on each side, but instead of a bridged battery the battery is connected by its live terminal to the point on the bridge between the two relays. The result is that when the plug is inserted in a jack a local circuit is closed through the cut-off relay on the sleeve side of the jack and line as follows: *10-26-27-r2-P-J-R2-3a-12*-battery. This cuts off the signal, while the other cord relay, on the tip side, takes current through the subscriber's line and substation, so the operation is otherwise as usual, the talking curent being thus provided for the subscriber's transmitter.

794,349—W. W. Dean. Telephone System.

This is another system of the same group. In this case the cut-off relay is differentially wound and is included with its two windings in the tip and sleeve side of the line respectively, between the line relay and the jack springs. The line relay and main battery are bridged, and the cord circuit is the same as in the last patent, *i. e.*, the live side is to both cord conductors through the relays *r* and *r2*. When a plug is inserted a local circuit through one side of the cut-off relay is established as follows: *10-28-27-r2-P-J-14-3a-12*-battery. The cut-off being thus energized breaks the lamp circuit.

794,370—T. Matheny and R. C. M. Hastings. Telephone Lock-out Mechanism.

This is a selective lock-out mechanism for party lines. The invention really lies in the arrangement of the mechanism, which is quite complicated—on paper—so a description without full illustration is difficult. Each station has a step by step wheel, but, instead of this being moved around from central as usual, it is moved by the subscriber, who must send his number in this way before he can get any connection. He has a handle, and in making a call this is pushed over a number of times corresponding to his number, each time stepping over the locking wheel until a pin—set at a different point at each station—comes to a lever, which it pushes up, shooting a locking bolt and at the same time unlocking the receiver hook so the instrument can be taken down for use. The called subscriber has to go through the same performance to unlock his switchhook, and then either of them can work a circuit breaker in a third wire which passes to all the stations, which de-energizes the locking magnets at all the stations (all these being in series in the wire), each magnet then positively locking its switchhook, so no one else can cut in on the line. An indicator is pulled down to show "busy" at the same time. After clearing out the line shows clear, and all parts are returned to normal or zero position by suitable retractile springs.

794,686—E. W. Schneider. Portable Audiphone.

Mr. Schneider is assignor to the Mears Ear 'Phone Company of New York. His instrument is not startling in its novelty. It comprises a handle, like the Swedish combinations, with the receiver on one end and the transmitter plugged into the other end. The batteries are in the handle, with plug and socket connections at both ends thereof.

794,702—W. W. Dean. Telephone System.

This is another of the group of two-wire patents referred to above, assigned to the Kellogg Company and intended to cover the earth. There are two cut-off relays for each line in this system, both in series with the line relay and both relatively sluggish and insensitive while the line relay is sensitive. When a subscriber's call is answered the insertion of the plug *P* causes cut-off relay *r* to get current over the sleeve side of line, whereupon both the other relays *r2* and *r3* are cut off. On the other hand, if a line is to be called and the subscriber has not yet, of course, taken down his receiver, the relay *r* will not work, so this is the reason the relay *r2* is provided. The insertion of plug *P2* causes the relay *r2* to become energized, whereupon the line lamp *S* is extinguished by the cutting off of its relay *r3*. The supervisory relays work as usual.

INDEPENDENT DEALS IN IOWA.

A deal has been consummated whereby the Northern Telephone Company, with headquarters at Fonda, Iowa, has come into possession of the local exchange at Pocahontas with 145 telephones, the stockholders of the latter company becoming stockholders in the Northern Telephone Company. The Northern company now owns exchanges in Pocahontas, Buena Vista and Cherokee counties; has over 1,500 miles of wire, with a total of 1,750 subscribers. The capital stock has been increased to $150,000. The company has in contemplation the construction of lines giving direct connection with Sioux City.

The Independent Telephone Company of Council Bluffs, Iowa, has chosen Clarence Judson as chief engineer and has given him full control of the work of construction of the plant and toll lines. Mr. Judson's estimate is that the new plant will involve an expenditure of about $200,000 before it is ready for business, and that about $100,000 will be spent in Council Bluffs this summer. The actual work of construction will begin about the middle of this month, and a force of from sixty to seventy men will be employed in the city work, and as fully as many on the lines outside of town. Conduits of double the capacity at first required will be laid on Broadway and Main street, within the limits where the overhead wires are prohibited. Mr. Judson says the underground lines will probably be extended several blocks beyond the required limits, as it will be the policy of the company to get as many of its main cables underground as possible. Open wires will be sparsely used, and only where the service is temporarily too light to warrant the use of cables. Throughout the main portion of the city aerial cables will be hung on the poles. Mr. Judson thinks the construction work will be completed sufficiently by the holidays to permit the opening of the exchange for business the first of next year.

Reports which have been filed in the office of the state auditor of South Dakota show that 157 telephone companies have reported for this year, an increase of more than 50 per cent over last year.

Personal

P. T. Spencer has applied to the board of trustees for a telephone franchise at Alhambra, California.

Oscar Turnquist has been appointed manager of the new telephone company at New Ulm, Minnesota.

Will Harring has been appointed manager of the Macon (Mich.) Telephone Company in place of Robert Mills.

Tellas Liegan is to be manager of the exchange of the Elkhorn (Iowa) Telephone Company at Brayton, Iowa.

E. M. Eigelhart has been granted permission to build a telephone line from Marshall to Waverly, Missouri.

James Bennett of St. Peter, Minnesota, has been chosen financial manager of the Nicollett County Telephone Company.

Harry Sommers of White Sulphur Springs, Montana, is interested in the promotion of a local telephone exchange.

W. R. Jones has purchased a third interest in the Yellville (Ark.) Telephone Company and has been elected president of the same.

W. E. Blaisdell and Fred C. Clark of Bakersfield, California, have been granted a franchise to operate a telephone line in the county.

Frank J. Ruehlman of the Swedish-American Telephone Company of Chicago spent two weeks in Wisconsin last month on his vacation.

E. W. Bennet and J. J. Shepperd of San Angelo, Texas, have made a contract with the citizens of Ozona, Texas, to install a telephone exchange.

J. B. Brown and R. L. Hipp, representing the Citizens' Telephone Company of Cullman, Alabama, have been granted a ten years' franchise.

J. H. Culver, J. B. McMillen and V. E. Converse have purchased the Sidney (Ill.) Home Telephone Company, and have taken possession of the same.

Coon Brothers of Rantoul, Illinois, are building a new telephone line north of Dillsburg and Gifford, which will connect with the Gifford exchange.

B. N. Stevenson and Frank A. Hazelbaker, of Dillon, Montana, are interested in the promotion of a telephone line extending to the Big Hole basin.

C. O. Trask of Alma, Michigan, has been appointed secretary and manager of the Co-Operative Telephone Company of Detroit, to succeed A. A. Cowles.

H. K. Cole, manager of the Home Telephone Company of Owensboro, Kentucky, announces that he will establish an exchange at Whitesville and Utica.

C. H. Macklin, general manager of the Swedish-American Telephone Company of Chicago, recently spent a week in Iowa, combining business with pleasure.

Frank E. Morrow, who for several years has been the auditor for the Western Electric Telephone Company, has resigned his position and returned to Britt, Iowa.

Austin H. Warr of the Lewistown (Mont.) Telephone Company announces that his company will at once commence the construction of a line from Lewistown to Billings.

J. K. Johnston, manager and secretary of the Home Telephone Company of Goshen, Indiana, owning all the Independent lines and exchanges in that county, has resigned his position.

Gustave F. C. Bauer, advertising manager for the Century Telephone and Construction Company of Buffalo, New York, is the happy father of a fine boy, who arrived on June 10.

W. T. Reeser, who has had a franchise in Lawrence, Kansas, has sold the same to the Kansas City Home Telephone Company, which will install an Independent plant there soon.

E. A. Hughes of Bismarck, North Dakota, has let the contract to R. H. Hankinson of Hankinson, North Dakota, to build a telephone line from Bismarck to Underwood, North Dakota.

Burton Osborne of Camden, New York, is interested in the construction of a telephone line to Williamstown, New York, and later expects to continue the line to Oswego, connecting with local points.

F. H. Holyrod, formerly with the Chicago Telephone Company, has accepted a position with the Eureka Electric Company of Geneva, Illinois, as traveling representative through the southwest.

F. L. Middleton, sales manager of the International Telephone Manufacturing Company of Chicago, is making an extended business trip through Iowa. J. C. Murray, salesman for the same company, with headquarters at Des Moines, is at present at the Chicago office, having just recovered from an illness of several weeks.

E. C. Ball of West Branch, Iowa, has been secured by the Davenport-Tipton Independent Telephone Company to take the position of manager, made vacant by the resignation of W. E. Geiger.

H. S. Lamb, manager of the Union Telephone Company of California, Pennsylvania, was in Canonsburg, Pennsylvania, recently to attend to the opening of the new exchange of the State Mutual Company.

W. W. Finney of Neosha Falls, Kansas, has purchased of Frank Brown of Topeka the stock of the Emporia (Kan.) Independent Telephone Company, which gives Mr. Finney a controlling interest in this company.

Messrs. T. D. Presnell of Smithland, H. E. Worten of Hampton and Gus Dunn of Birdsville, Kentucky, the three leading telephone men of the county, have formed a partnership and will cover the county with lines.

J. A. Wayland, F. Beadle, L. B. Davidson and J. R. Smith have presented a petition to the city council of Girard, Kansas, asking that a municipal telephone system be established, to be owned by the town.

J. T. Bebout of the Claysville (Pa.) Telephone Company and W. C. Handlan, manager of the National Telephone Company of Wheeling, West Virginia, are arranging for the establishment of an exchange at Claysville.

W. M. Davis, formerly with the Stromberg-Carlson Telephone Manufacturing Company of Rochester, New York, has taken a position with the Eureka Electric Company of Geneva Illinois, in its switchboard department.

G. H. Ross and F. W. Ziesenis have purchased the telephone exchange at Chetek, Wisconsin, from the Rural Telephone Company. They will make some needed improvements and will possibly extend the line to Sand Creek.

William Creighton, who has been construction foreman of the Wayne-Monroe Telephone Company, has resigned. He will return to his home at Fine, St. Lawrence county, New York, to take up other business interests.

J. D. Arnett and Harmon Hobart state that the Iola (Kan.) Telephone Company has decided to put in a common battery central energy system in Iola at an expense of $30,000. The system will also be extended to Gas City.

Nathan T. Folwell, a leading manufacturer and president of the Manufacturers' Club of Philadelphia, has been elected president of the Keystone Telephone Company of that city and has taken charge of the reorganized company.

Manager Murray of the Fort Worth (Texas) Telephone Company states that work has begun on the long-distance line between Fort Worth and Dallas. Plans have also been arranged for a line between Sherman and Gainesville.

G. G. Hostutler, banker, of Palmer, Kansas, who promoted the organization of the Palmer Rural Telephone Company early in this year, and has also been its manager, has resigned his position and will be succeeded by Alvin Tegeler.

Osher Schlaifer, John Brenner, Roscoe Anderson, and Orin Shranger of Humboldt, Nebraska, have purchased a controlling interest in the Table Rock (Neb.) Telephone Company. Mr. Brenner will act as manager of the new company.

Professor G. W. Wilder has been granted a leave of absence from the Armour Institute of Technology until next fall in order that he may engage in telephone work. He has also resigned his position as technical editor of *Sound Waves*.

Ed. M. Scott, cashier of the Security National Bank of Cedar Rapids, Iowa, has been elected president of the Cedar Rapids & Marion Telephone Company, to succeed George T. Hedges, who has disposed of his interests in this company.

J. C. Breban of Philadelphia has succeeded Edward G. Willis as superintendent of the Standard Telephone and Telegraph Company at Newtown, Pennsylvania. Mr. Willis was employed by the Inter-State Telephone Company at Trenton.

E. de los Magee, an attorney, and Dr. Ferdinand Butterfield, San Francisco, and eastern capitalists, will make application to the board of supervisors of San Francisco for a franchise with a view to operating an Independent telephone system in that city.

Charles A. Carl, manager of the United Telephone and Telegraph Company's office at Carlisle, Pennsylvania, has been transferred to the office at Chambersburg. H. F. Snyder, heretofore attached to the Harrisburg office, has been sent to Carlisle.

B. F. Wasson, president of the National Telephone & Electric Company of Clinton, Illinois, who had the telephone exhibit at the St. Louis World's Fair, was awarded a gold medal for same. Mr. Wasson has loaned the entire exhibit to Purdue University.

B. B. Pullen, Charles Humphries and Dr. Alexander, representatives of the Lily Telephone Company, are making an effort to enter

Mayfield, Kentucky, for the purpose of supplying telephone exchange service in connection with the country service to be supplied.

W. H. Bryant, who has served the Home Telephone Company of Mobile, Alabama, for a number of years as manager, has been elected vice-president of the company. He will also continue as manager.

Horace I. Barnes, who has been manager of the West Bend, Wisconsin, telephone exchange for the past three years, has gone to Fond du Lac, where he has a position with the telephone company. He has been succeeded by J. A. Cooper of Watertown.

Major Edward Russell, on duty in the office of the chief signal officer of the army at Washington, D. C., has been ordered to report to the isthmian canal commission to go to the isthmus and install a complete system of telephonic and telegraphic communication.

E. M. O'Brien, who recently resigned as manager of the Des Moines exchange of the Iowa Telephone Company, has been appointed general manager of the Mutual Telephone Company of Des Moines. Mr. O'Brien succeeded J. S. Bellamy, who recently resigned.

Judge Robert E. Umbel, John M. Core and Robert F. Hopwood, the executive committee of the Tri-State Telephone Company, have effected a deal in Uniontown, Pennsylvania, whereby the Tri-State company becomes the owner of the Monongahela Valley Telephone Company.

Wm. Krotter & Company of Bonesteel, South Dakota, are constructing a new telephone line to Wheeler, which will connect at that place with the Dakota Central. Mr. Krotter has an extensive telephone system covering the Rosebud country and also reaching a great many towns in Nebraska.

F. M. Ashe is promoting a copper metallic telephone line, which will connect Burlington, Iowa, on the west with the Interstate Independent Telephone Company on the east. The principal exchanges that will be included in the proposed system will be Kewanee, Galva, Galesburg, Monmouth, and Burlington.

C. J. H. Woodbury, assistant engineer of the American Telegraph and Telephone Company of Boston, delivered the address to the graduating class of the Thomas S. Clarkson Memorial School of Technology at Potsdam, New York, on June 9, taking as his subject, "The Engineer as an Economist."

Dr. H. E. L. Reid, president of the Reno (Nev.) Street Railway, has filed a petition with the city council asking for a franchise to operate a telephone system in Reno. The request has created considerable discussion, and it is probable a fight will result with the Sunset company, which now has a system in the field.

A. Meinema, the well-known inventor of the Meinema lock-out telephone, was married at Columbus, Ohio, June 13 to Miss Louise Coe, one of the Buckeye state's most beautiful and accomplished young women. They are now at home at the Oakwood apartments, Austin avenue and South boulevard, Oak Park, Illinois.

Dr. G. S. Root, secretary and manager of the Lake Shore Telephone Company of Hart, Michigan, is making arrangements for an active campaign for business for his company in Mason county the present season. It is the intention to extend the lines in the northeast part of the county, through Tallman, Bachelor, Freesoil and to Manistee.

M. B. Huntoon, a graduate of Ann Arbor, '95, and Minnesota, '09, who was until recently assistant engineer for the Michigan State Telephone Company at Detroit, has been elected to the professorship of telephone engineering at Purdue University, succeeding James C. Kelsey, who has accepted a position with the Kellogg Switchboard and Supply Company.

E. H. Martin, president of the Martin Telephone Company of Webster City, Iowa, has called a meeting of representatives of all the toll operating companies in Iowa for the purpose of establishing a checking bureau or clearing house, where the business of all the companies in the combination will be settled and from which reports will be sent out.

Messrs. Rawlins, White and Walker of Manchester, Kentucky; Judge H. C. Faulkner of Barbourville, and others, have organized a company for extending the lines from Burning Springs to Booneville, Owsley county, thence to Beattyville; also a line from Booneville to Telega and to Heidelberg. An exchange will be estabished at Booneville.

Roscoe Howard has been chosen manager of the Home Telephone Company and assumes his duties July 1. Mr. Howard succeeds W. M. Godfrey, secretary of the Empire Electric Company, who goes to Portland, Oregon, to install a home plant in that city. Manager Howard states that the extensions recently announced will be made with the least possible delay.

W. E. Rose, advertising manager of the Los Angeles (Cal.) Home Telephone Company, took several hours off fishing at Avalon, Catalina Island, one day recently, in company with another local piscatorialist, and the two landed twenty-five fish—four yellow tails, fourteen bonita and seven bass. The total weight of the fish was 208 pounds. The largest yellow tail caught weighed 29½ pounds and put up a terrific fight, which lasted for thirty-five minutes.

T. W. Warner, general manager of the Warner Electric Company of Muncie, Indiana, accompanied by his wife, is in Europe on a combined business and pleasure trip. While on the continent Mr. Warner will make a study of the telephonic conditions there. Mr. and Mrs. Warner are spending three months in Italy, Switzerland, Germany, Belgium, Holland, France, England, Scotland and Ireland, and expect to return home in August.

C. C. Curtis, manager of the Independent telephone exchange at Sandusky, Ohio, has taken the position of manager of the southern Ohio district for the United States Telephone Company. The field has been included in other districts, but recently a division was made, and Mr. Curtis will have charge of nearly all the territory south of Youngstown and Lima, with the exception of Dayton and Columbus and the counties surrounding these cities.

Charles F. Gronendyke, wire chief of the Union Electric Telephone & Telegraph Company, of Davenport, Iowa, has resigned his position and has accepted one embracing the same duties with the Canton Home Telephone Company, of Canton, Illinois. Mr. Gronen- Company for the past three years, and upon his departure was dyke has been with the Union Electric Telephone & Telegraph presented with a solid gold watch fob from the employes.

Miss Marian H. G. Bell, daughter of Professor and Mrs. Alexander Graham Bell, recently was married at Twin Oaks, Washington, D. C., to David G. Fairchild. Miss Bell is devoted to the study of electricity and had been an almost constant companion of her father in his researches. Mr. Fairchild is foreign explorer for the Agricultural Department of the government, and is the son of President George T. Fairchild of the Kansas State Agricultural College.

Miss Mae Welch, bookkeeper in the long-distance office of the Johnson County Telephone Company at Iowa Falls, Iowa, recently resigned her position on account of ill health. Miss Mamie Hersher, chief operator in the long-distance office, has been promoted to her post. Miss Lottie Miller, assistant chief operator in the main office, succeeds Miss Hersher, Miss Frona Hellmer is Miss Miller's successor, and Miss Gay Conklin takes Miss Hellmer's place.

William D. Brewster, president of the Chagrin Falls (Ohio) Telephone Company, met with a fatal accident at his home on May 3. While starting a fire with coal oil the stove exploded, setting fire to the room and fatally burning Mr. Brewster. Mr. Brewster was an enthusiastic Independent. He organized the Chagrin Falls Company in 1895 and has successfully engineered it ever since. Mr. Brewster was also cashier of the Chagrin Falls Banking Company.

Louis Hollweg, formerly vice-president of the Indianapolis Telephone Company, has been elected president, and H. B. Sale, formerly secretary-treasurer of the company, has been elected vice-president and general manager. These changes were made necessary by the death of the Hon. S. P. Sheerin, late president of the company. Mr. Hollweg, who was vice-president of the New Long-Distance Company, was also elected president of that company. A. F. Ramsey remains vice-president of the company; H. B. Sale, secretary, being elected general manager.

Frank L. Beam, former manager of the Citizens' Telephone Company of Columbus, but now president and general organizer of the Ohio Independent Telephone Association, recently returned from a trip over the state looking after the interests of the association. "I found things in good shape," said Mr. Beam. "The increase in the use of the telephone is something wonderful, and there is hardly an exchange in the state which is not behind on contracts. The expansion of the telephone seems to have only begun." Mr. Beam has opened an office in the Outlook building.

Gansey R. Johnson of New York has accepted the position of manager of the Citizens' Telephone Company at Columbus, Ohio, succeeding Frank L. Beam, who resigned to enter upon his duties as organizer of the Ohio Independent Telephone Association. Mr. Johnson is now secretary of the American District Telegraph Company, a position which he has held for some time. Having formerly lived in Columbus, he is acquainted with the conditions there. Mr. Beam, who is president of the association, will take charge of the work of that organization at once and will push forward the organization as rapidly as possible.

George A. Scoville, a graduate of the electrical engineering course of the Leland Stanford University of Palo Alto, California, has recently allied himself with the Dean Electric Company of Elyria, Ohio, as one of W. W. Dean's assistants in the engineering department. Mr. Scoville's previous training in the art of telephony has been such as to eminently fit him for this new position. Like many other Independent telephone engineers, he started in the Western Electric Company's factory at Chicago, and from 1898 to 1901 worked in its telephone switchboard assembling department and acted as installer of telephone exchanges, and just before leaving to complete his college course was an assistant in its telephone engineering department. After graduating, Mr. Scoville was connected with the Los Angeles Edison Company in its testing department, and just previous to joining the Dean force he was again with the Western Electric Company, assisting in the installing of its latest switchboard equipment on the Pacific coast.

Decisions Affecting Telephony

G. W. HAND

CUTTING OF WIRES TO ALLOW MOVING OF BUILDINGS IN MASSACHUSETTS.

IN a recent case the Supreme Judicial Court of the above state held that the moving of a building along a highway, when permission is obtained from the proper authorities, is a use of the highway, within the statutes of 1882, chapter 109, providing for the necessary cutting, disconnecting or removing of electric wires in the necessary use of the streets. It is, therefore, the law in this state that if a building mover exercises reasonable care in removing wires of telephone or telegraph companies to make way for moving buildings that he will not be liable for any damages above the actual expense of replacing the wires as he found them. The writer does not intend to say whether the building mover would be liable in damages for the damage occasioned by the necessary cutting, but it is clear from the case above referred to that there would be no liability beyond the minimum expense of replacing the wires. No damages for loss of business or other resulting damages could be collected.

A. M. Richards Building Moving Company v. Boston Electric Light Company, 74 N. E. 350.

AUTHORITY OF PROBATE COURTS TO ADJUST RATES IN OHIO.

The difficulty of the Toledo Home Telephone Company in securing a franchise in Toledo is familiar to the readers of TELEPHONY. It also will be recalled that after failure to come to an understanding with the municipal authorities regarding the location of its poles and wires it applied to the Probate Court of Lucas county in accordance with Section 3461, Rev. St. 1892, for the purpose of having that court determine in what mode the telephone lines should be constructed along the streets, alleys and other public ways of the city. In this petition the telephone company made an offer of rates which were not to exceed $44 a year for business telephones and $26 a year for residence telephones. These rates were adopted in the order made by that court prescribing the mode of use of the streets of the city in the construction and operation of the telephone system. On September 1, 1903, the company gave notice that it would not renew contracts at the above rates after their expiration and that from and after said day it would charge $52 a year for business telephones and $32 a year for residence telephones.

The city of Toledo thereupon began proceedings before the Supreme Court of Ohio to oust the company from the exercise of its privileges. The principal point of interest and the difficult legal question involved was the right or authority of the Probate Court under the legislative provision conferring authority upon it, on the condition of failure, between municipal authorities and telephone companies or telegraph companies to reach an agreement regarding the use of streets, to decide upon the location of lines, and to at the same time decide upon the rates which such companies may lawfully charge. In this case the telephone company of its own accord offered a set of rates and operated under it for some time, and at no time did it attempt to vary any contracts it had entered into with any of its subscribers, but it did claim as a matter of right the authority to change its rates with new subscribers as it saw fit; further, that the Probate Court was entirely without authority to regulate the matter of rates. The Supreme Court in disposing of this question, said as follows:

We are quite confident that the Probate Court was without jurisdiction in the proceeding to make an order as to rates for the use of telephones, and, therefore, that part of its order is a nullity. If this conclusion is sound there is no basis for the charge made in the petition upon which we are asked to award an ouster of the respondent. It is urged for the city that the proceeding in the Probate Court amounted to a contract between the company and the city. This claim is founded upon the application which asked the court, among other things, to fix the rates suggested and the order of the court made thereon in connection with the order prescribing the mode of using the streets, and if such contract resulted from the proceeding it is an abuse of the franchise privileges and rights conferred for the company now to break its contract. Was there a contract made in that procedure? Who were the parties and were they competent to make such contract? The proceeding reached the Probate Court because the city and the company could not agree either as to the rates or the mode of use of the streets, for both of these were subjects of provision in the ordinance proposed by the company for passage by the council. We are informed by counsel for relator that the Probate Court acted in behalf of the city, which was made party to the proceeding. But that proposition seems untenable when we reflect that the court has neither expressed nor implied authority to enter into any such contract and a statute which would undertake to confer upon that court the right to enter into such contracts would be open to serious attack. We are not deciding in this case that the city, through its municipal authorities, and the telephone company may or may not make a building contract for rates to be charged for the use of telephones. This question is not before us and we express no opinion upon it.

It is said that the company should be bound by the representations as to rates which it made in its application, for the reason that they were made to induce the order it obtained from the court as to the mode of using the streets. Whether such representations had the effect imputed we know not, but the Probate Court had no discretion to exercise as to directing the mode of using the streets and other public ways. The statute imposes a positive duty and the court could not annex a condition that the directing of and mode of use of highways should be dependent upon submission to any certain schedule of rates. Again, to whom were the representations made if not to the court? They were not expressed to the city or its citizens. The city was a party to the proceeding, but not as a contracting party. It was not contracting with the company through the medium of the Probate Court or the then pending proceeding, and it had no legal authority to do so. The representations made in the application as to rates were addressed to the court and we have seen that the court could not be a party to any contract upon that subject. Therefore, no party has been induced to enter into a contract and no party to a contract has been misled or induced to change position by the representations or conduct of the company. * * * No ground for the writ of ouster has been established.

State v. Toledo Home Telephone Co., 74 N. E. 162.

INTERFERENCE WITH POLES BY LAND OWNER.

The Greenwood Telephone Company, which operates in Johnson county, Indiana, erected a line of poles and wires across the real estate of one Margaret Heck of the above county. The strip of land on which the poles were set was in process of condemnation for a public street at the time the line was constructed. For some reason the landowner decided that she would not have the line of poles on her property any longer and thereupon proceeded to, and did in fact, cut down many of them. Injunction proceedings were then begun by the company to prevent further interference and a judgment of $53 for damages was recovered. The case has been appealed, wherein it was held that the company had failed to make a sufficient showing that it had authority from the land owner to erect its line and that for this reason, notwithstanding the fact that she discovered the workmen erecting the poles while they were at work, and thereby in a measure consented to the erection of the

line, the company would be compelled to try the case over again to make the showing of authority which the Appellate Court decided was wanting at the hearing in the lower tribunal.

Heck v. Greenwood Telephone Company, 73 N. E. 960.

CONTRACT TO GIVE TELEPHONE SERVICE FOR PRIVILEGE OF PLACING POLES ON PREMISES.

The Mt. Sterling Telephone Company of Mt. Sterling, Kentucky, in erecting a telephone line from Mt. Sterling to the Levee, a village some eight miles distant, in the above state, wished to pass over the farm of one George W. Anderson, and as a consideration for the privilege and to fasten its wires on the trees on Anderson's farm agreed verbally to erect and maintain a telephone in his house. The line was erected under the above conditions and Anderson enjoyed the privilege of a telephone for some time in turn for allowing the company the use of his trees and fences for the purpose indicated. Finally the company decided to remove Anderson's telephone and to prevent it he secured an injunction, which the company sought to have set aside for the following reasons:

(1) That the contract for use of the trees and fences was for the sale of realty and the contract being in parol could not be enforced.

(2) That the contract was not to be performed within a year and was, therefore, in violation of the statute of frauds and void.

The above statement of facts will make clear the following quotation from the opinion of the Court of Appeals on the questions:

The statute provides that no action shall be brought to charge any person upon any contract for the sale of real estate or any lease for a longer term than one year. The telephone company under the contract in question obtained the use and occupancy of Anderson's land, with its telephone poles and wires, for the consideration that they would furnish him the telephone service stated. The company's purpose is to hold what it obtained under the contract, and take from Anderson that which it gave in consideration for it. The company is not giving up the benefits which it obtained under the contract, although it seeks to hold the consideration which it gave for them. This is not an action to recover the consideration which the company obtained for benefits received, and therefore it is not an action, in the meaning of the statute, to charge the company upon a contract for the sale of real estate. The company is resisting Anderson's effort to regain the consideration which it gave for the valuable right received and which it now enjoys. "It is a resisting equity" which the appellant (Anderson) has, and which he invokes to prevent the attempted wrong to him.

The Court of Appeals accordingly ordered an injunction issued to give Anderson the relief he asked for in his petition.

Anderson v. Mt. Sterling Telephone Company et al, 86 S. W. 1119.

FELLOW SERVANT RULE IN SOUTH CAROLINA—CONSTITUTIONAL PROVISION.

A suit was recently decided by the Supreme Court of South Carolina in which the question arose whether a foreman of a gang of laborers engaged in clearing a way for a line of telegraph was a master or fellow servant of one of the laborers in the sense that the latter could sue the telegraph company for injuries sustained as follows: One Brabham, a laborer, with several others was instructed to remove a certain tree from an upright position against another on which it fell and in doing so the lodged tree broke and injured him severely. He claimed negligence on the part of Brabham in directing him to do so dangerous a thing. A provision of the constitution found in Section 15, Article 9, says, "When injury results from the negligence of a superior officer or agent, or of a person having a right to control or direct the services of the party injured," an employe of a railroad corporation shall have the same right of action that he would have in case the master were directly in charge. Brabham sought to invoke this modification of the general rule, but the court held that it had application only to railroad workmen and had no reference to other corporations. The Supreme Court in its decision said:

When one takes employment under another, which includes the regular and ordinary risks of the employment, which includes the negligence of a fellow servant. In determining who are fellow-servants the test or rule in this state is not whether the servants are of different grade, rank or authority, one of them having power to control and direct the services of another, but the test is in the character of the act being performed by the offending servant, the performance of which duty the master had intrusted to the offending servant. The general duty of a master is to exercise due care in the selection of servants, to furnish appliances reasonably adequate and safe for the performance of the work, and to provide a reasonably safe place in which to work. Now the complaint shows that Handberry (the foreman) was in control of a gang of laborers, all of whom, including Handberry, were engaged in a common employment, clearing the defendant's right of way; Handberry, however, having the duty to superintend and direct the handling of the laborers, and they were subject to his orders. If Handberry had been intrusted by the defendant with the duty of supplying the block and tackle to raise the tree, and had furnished a defective one, that would have been a breach of duty which the master owed to the laborer.

For such an injury there would be a liability. Considering these facts and rule of law the Supreme Court held that Handberry was a fellow servant of the other laborers and that the company was not liable for his negligence, if he was, in fact, negligent.

Brabham v. American Telephone & Telegraph Company et al, 50 S. E. 716.

MANDAMUS REQUIRING TELEPHONE COMPANY TO FURNISH SERVICE.

In this case Emil Bayer applied to Justice Samuel Greenbaum, at Part I, special term of the Supreme Court of the State of New York, for a mandamus requiring the New York Telephone Company to furnish telephone service to him at No. 1285 Broadway, New York City, where he said he was engaged in the business of "furnishing news of all description to athletic associations, hotels, etc." The company had refused his request for service on the ground that his place had been raided by the police, who removed the telephones then and there and arrested several persons on the charge of betting on horse races, etc., in violation of Section 351 of the Penal Code. Although unable to convict these persons so arrested, who were promptly discharged by the police magistrates, before whom they were arraigned, the police officials, in affidavits made in opposition to the application for a mandamus, alleged facts indicating the truth of their charges that the law mentioned had been violated, and asserted their opinion that if the telephones were re-connected they would be used for the purpose of aiding the commission of the crime referred to. The mandamus case was argued before Justice Greenbaum, who rendered the following decision:

"The opposing affidavits show that the telephones were originally removed by the police under circumstances establishing that they were used for the purpose of selling pools in violation of Section 351 of the Penal Code. Mandamus will not lie upon such a showing. Motion denied with ten dollars costs."

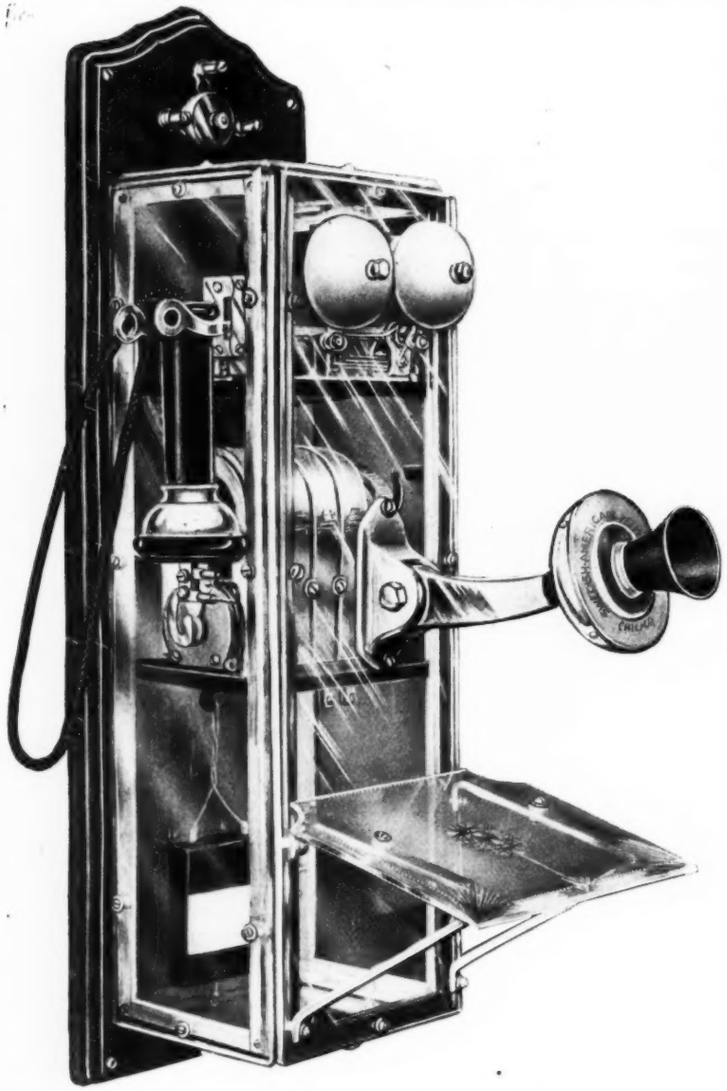
Emil Bayer v. New York Telephone Company.

Robert Willard is a farmer living near Elkhart, Logan county, Illinois. He went to Lincoln and was arrested for drunkenness, but escaped from the authorities and returned home. The next day he called up Justice Rudolph in Lincoln, by telephone, told that worthy that he could not possibly lose the time to drive into Lincoln and be tried, so he pleaded guilty by telephone. The justice fined him $14 and he promised to send the amount by mail. The justice agreed to this, the trial was concluded and Willard sent the money, expressing himself as well satisfied with the course of justice.

Manufacturers' Department

A NOVEL TELEPHONE.

The Swedish-American Telephone Company of Chicago has always enjoyed the distinction of being one of the most original telephone manufacturing concerns in the field. The accompanying illustration shows a telephone, the case of which is made of plate and cut glass. It has not been an unusual thing to see telephones made of rare woods, such as mahogany, ebony, birdseye maple, etc., but the production of a glass telephone was something unthought of, except by the originators.



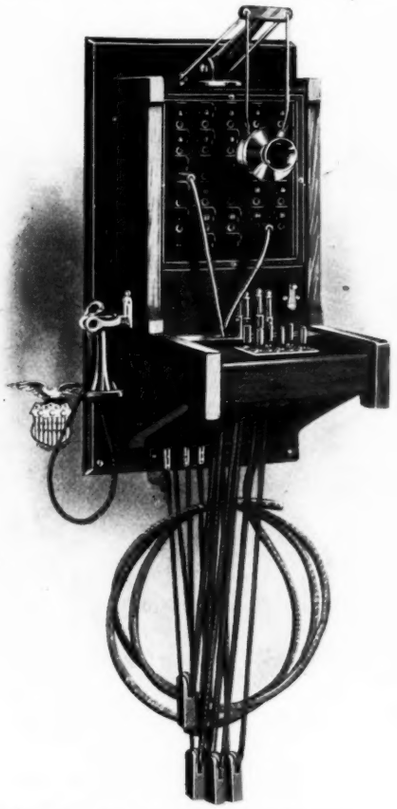
TELEPHONE MADE OF GLASS.

This instrument was shown at the recent National-Interstate convention, not only for the purpose of showing the skill of Swedish-American workmen, but to show the methods of installing parts and to demonstrate the simplicity of construction and accessibility of parts of the Swedish-American instrument. It will be observed, by referring to the illustration, that all the parts are plainly visible without opening the case.

The sides and front of the cabinet are made of beveled French plate glass, fastened by means of machine screws to the nickel-plated framework. The desk or shelf is also made of plate glass and has a beautiful design cut upon it. When placed upon the wall this telephone makes a beautiful appearance, and it attracts the admiration of all who see it.

SWITCHBOARD FOR RURAL SYSTEM.

A line of rural system switchboards, such as shown in the illustration, has been put on the market by the Cadiz Electrical Company of Cadiz, Ohio. This company devotes itself to the manufacture of rural line telephone equipment exclusively, and by making a special study of the conditions under which these systems are operated, claims that it is in a better position to furnish a satisfactory line of such equipment than concerns with whom the supply of such apparatus is a side issue.



RURAL EXCHANGE SWITCHBOARD.

The most important feature in the switchboard shown is simplicity; wherever a complication could not be avoided that particular part was designed as an easily removable unit. For instance, the drop where the connections between the jack springs, the coil and the terminals are a little difficult to understand to the uninitiated, the drop, jack and terminals have been made into a self-contained and individually removable unit.

Should any part require repairs, the drop unit can be removed by loosening two thumb-nuts and an extra unit, carried in reserve, substituted. The damaged one can be mailed to the factory for repairs at a nominal cost. This principle of construction renders the employment of an expert un-

necessary. The ringing and listening keys are of an improved type with the springs so arranged that the contacts are exposed to view and readily accessible for cleaning. The switchboard can be provided with several different arrangements of apparatus, according to local requirement.

These switchboards have handsome oak cabinets and the equipment is neatly finished in ebony black. Lastly, durability has been given due consideration, every detail carefully proportioned, and these switchboards, it is claimed, will be found in first-class condition after years of heavy service.

TORNQUIST ELECTRICAL MANUFACTURING COMPANY.

J. A. Tornquist, president of the Tornquist Electric Manufacturing Company, of Davenport, Iowa, is a young man, thirty years of age. He is very earnest in his efforts to supply the needs of the trade in this particular line of goods, and assumes a quiet and determined aspect in regard to his company's welfare. He is making strong efforts to get out only good goods and will try and prove that nothing better can be accomplished in the way of workmanship and quality. This company is finding a ready sale for its goods, and Mr. Tornquist is always ready to do what is right by his patrons. It is safe to assume that the details of any

J. A. TORNQUIST.

GEORGE J. BARKER.

business have not been more carefully and conscientiously investigated and studied than that of the Tornquist Electrical Manufacturing Company by Mr. Tornquist.

George J. Barker, secretary and treasurer, is an exceptionally capable man for his branch of the work, having had a large amount of factory experience. For the last twenty-five years he has been connected with some of the largest manufacturing establishments in Davenport, and has filled every position from shipping clerk to treasurer and stockholder. Mr Barker is a careful and conservative business man, and never undertakes anything without putting all his energy and efforts into the enterprise. He is a pleasant and agreeable gentleman to meet and is highly esteemed and respected by all who know him, either personally or through business dealings. It is safe to assume that the business and office end of the Tornquist Electrical Manufacturing Company is in efficient hands.

The Tornquist company, maker of the celebrated "Tornquist King of Protectors," reports a large demand for its protector, and claim that the large sales are evidence of its superiority over all other styles and makes of telephone protectors.

In order to supply the large demands for this device and the knife switches, which it is manufacturing, it has been necessary to put in more machinery and otherwise improve the factory. The company has recently commenced to mount its protector on the red lacquered slate, which is taking so well with its trade on knife switches. This slate not only makes a more attractive device, but also stands a better electrical test than the other grades of slate. It has also reduced the size of the protector, which seems to take very favorably with the telephone users. The company is placing upon the market as high a class of goods in this line as it is possible to produce, and is making its prices so low that a large share of trade is coming to it. The factory management work with the end in view to make their product so good that a customer after having once used their goods will specify "Tornquist" in his future orders.

The Tornquist Company will be more than pleased to quote prices and answer any inquiries in regard to its products. Send for its new reduced price list and circular matter. The motto of the company: "Goods of quality; prompt service." Address Tornquist Electrical Manufacturing Company, 409-411 West Fourth Street, Davenport, Iowa.

STROMBERG-CARLSON SWITCHBOARD SALES.

The Stromberg-Carlson Telephone Manufacturing Company, Rochester, New York, reports having closed contracts for switchboards for the following places: Auburn, N. Y.; Bird City, Kan; McDonald, Kan.; Coldwater, Mich.; Hannah City, Ill.; Pitman, N. J.; Lewisport, Ky.; Huntersburg, Ind.; Ormsby, Minn.; Seattle, Wash.; Arcadia, Mich.; Mulkeytown, Ill.; Tonica, Lostant, Ill.; Sinclair, Tex.; Center, Kan.; Mexico, Mo.

The company also reports having closed a contract with the North State Telephone Company, High Point, North Carolina, for a 1,200-line capacity generator call visual signal switchboard. It is stated that this is one of the foremost telephone companies in the state and is under the efficient management of J. F. Hayden.

The company has closed a contract with the Anderson Telephone Company, Anderson, South Carolina, for an 1,800 capacity lamp line signal multiple switchboard. The general manager, E. S. Moorer, is a progressive and experienced Independent telephone man. He says he is going to make this one of the most modern and up-to-date plants in the south.

BIG SALES OF "AMERICAN" GOODS.

The American Electric Fuse Company of Chicago reports that the sales on its new lightning arrester blocks No. 41 and 85 are very large. These blocks are provided with the new fuse clip for holding Western Union style fuses, and they always hold the fuse securely in place with a perfect electrical contact.

The American Electric Fuse Company is constantly mailing out new and attractive souvenirs, illustrating American goods. This summer it has sent out over 5,000 of its new No. 41 lightning arrester blocks, and 10,000 sample boxes of fuses. If you wish to get on the American Electric Fuse Company's mailing list send in the name of your company, together with a list of your exchanges and the kind of telephone, switchboard and protectors you use. It will pay you to be "on the list."

The American company is keeping abreast of the times and constantly making something new designed for the protection of either switchboards, cables or telephones. The new (American) block No. 87, illustrated in the company's advertisement on another page, is made heavy throughout, with patent Fahnestock binding posts, patent fuse clips and heavy carbons. At every point, the company claims, it shows perfection in detail. The company will be pleased to send circulars describing in detail this and other new and standard protector devices.

COUCH INTERCOMMUNICATING TELEPHONE.

The Couch Automatic Reset Intercommunicating Telephone, described and illustrated in this article, is an improved type of interior telephone, embodying many new and novel features. Extreme simplicity has been observed in its design, and it has less parts than any similar telephone now manufactured.

FIG. 1.

Fig. 1 shows the wall type, exterior view, and Fig. 2 shows the same with cover opened, every working part being exposed and of easy access. Fig. 3 is a sectional view, giving a very clear idea of the simplicity of construction. The left hand button is shown locked in a talking position, the right hand button being in the normal position. Three flat springs are used, R^1 being the station line spring, R^2 the common line spring, and R^3 for restoring the button. As these springs are always under tension (R^3 against the button and R^2 and R^1 against the hard rubber back-stop), a maximum pressure is obtained when they are in contact, and as all contacts are made by sterling silver rivets, all possibility of a poor connection is precluded.

To call, the button is pressed to its fullest extent, which places the spring R in connection with the ringing bar Q. When the pressure is removed the button returns until the locking plate engages the shoulder of the button, leaving

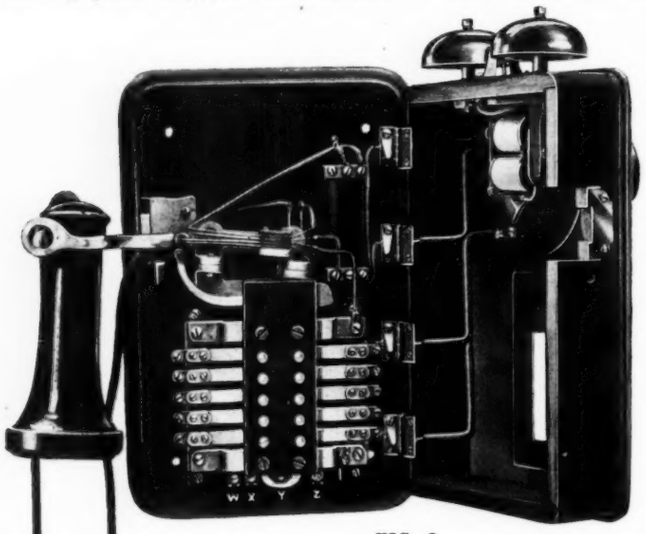


FIG. 2.

the springs R^1 and R^2 in contact. When the receiver is restored the locking plate releases the button and all springs resume the normal position.

The releasing device consists of but three parts, viz., the tripper, catch and locking plate, all of these operating by gravity, thus doing away with all spinal springs, which are a great source of trouble. The locking plate is so well balanced and accurately machined that it will work perfectly in nearly a horizontal position. The cable wires are attached directly to the terminals, under heavy brass screws, and all interior connections are made by rubber insulated wires and soldered connections.

It will thus be seen that all details have been carefully executed, with the idea of constructing an instrument free from any defects or weak joints.

The telephones work successfully on either a metallic or common return circuit, but on account of the saving in cost of cable, new systems are generally installed with a

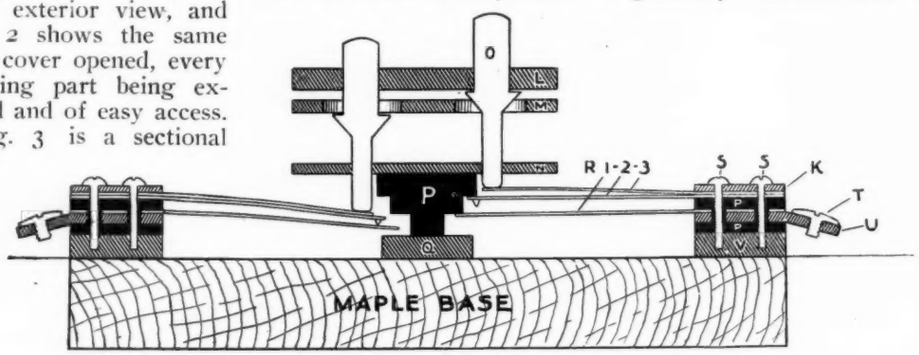


FIG. 3.

common return cable, as the Couch system allows any number of pairs of telephones to be talking simultaneously without the slightest trace of interference or crosstalk.

The system is extremely economical to maintain, two cells of battery (one cell of storage) being sufficient for the talking, and from four to eight for the ringing, according to the length of the lines. The telephone is made up in 10, 16, 20, 26 and 30 line sizes, although special sizes, both larger and smaller, can be furnished if required.

The directory plate is a very desirable feature and is furnished with the instrument complete with printed names. This apparatus is absolutely non-infringing, being manufactured under patents No. 559,874 and No. 634,575. Other patents are being applied for, covering several new features and methods of construction.

This entire line of automatic reset instruments is manufactured by S. H. Couch Company, Pearl street, Boston, and from whom further information may be obtained.

COOK INCREASES CAPACITY OF PLANT.

Frank B. Cook of Chicago has been obliged to increase the capacity of his factory, on account of the largely increased amount of business which he has secured, and has taken a portion of the building at 44 and 46 North Peoria street. This building is directly back of the building on West Lake street, where Mr. Cook's offices and factory are located. The two buildings have been connected, and Mr. Cook now has a large and commodious factory, which, it is hoped, will be capable of handling all orders received. Mr. Cook says if it had not been for this increased capacity, he would have been obliged to refuse orders, as the factory has been pushed to its limit for the last eight months, in spite of the fact that it has been run overtime and nights. The demand for Cook's latest self-soldering protector, No. 8, has been largely responsible for this condition, it is said, and the factory also has been taxed to its capacity for Cook's pole cable terminals, junction boxes, guy clamps and construction material.

Some of the orders for the No. 8 equipment which Cook has received recently, are as follows: United Telephone & Telegraph Company, Altoona, Pa., 1,800 pairs; Dean Electric Company, for Racine, Wis., 1,720 pairs; Dean Electric Company, for Dunkirk, N. Y., 660 pairs; Dean Electric Company, for Niagara County Home Telephone Company,

Niagara Falls, N. Y., 880 pairs; Dane County Telephone Company, Madison, Wis., 1,600 pairs. From the Stromberg-Carlson Telephone Manufacturing Company for the following exchanges: Twin City Telephone Company, Minneapolis, Minn., 1,780 pairs; Lawrence Home Telephone Company, Lawrence, Kan., 1,020 pairs; Kittaning Telephone Company, Kittaning, Pa., 800 pairs; State Line Telephone Company, Peekskill, N. Y., 640 pairs; Oneonta, New York, 200 pairs; Summerville Telephone Company, Dubois, Pa., 320 pairs; Tri-State Telephone Company, Faribault, Minn., 560 pairs; New Ulm, Minn., 400 pairs. From the Automatic Electric Company, for Wausau Telephone Company, Wausau, Wis., 700 pairs; Hastings Independent Telephone Company, Hastings, Neb., 600 pairs. From the Kellogg Switchboard & Supply Company, for the Surprise Telephone Company, David City, Neb., 500 pairs. Also from the following exchanges: West Texas Telephone Company, Ballinger, Texas, 800 pairs; Pocomoke Telephone Company, Pocomoke, Md., 200 pairs; Westfield, Ill., 200 pairs; Benson, Minn., 200 pairs; York, Pa., 300 pairs; Litchfield, Minn., 200 pairs; Columbus, Neb., 300 pairs; Virden, Ill., 300 pairs; Girard, Ill., 300 pairs; Birmingham, Ala., 320 pairs; Princeton, Ind., 600 pairs.

HAD AN INTERESTING EXHIBIT.

The Denio General Electric Company of Rochester, New York, proved one of the interesting exhibitors at the recent convention in Chicago, as its product is a new departure in the telephone field, and judging from the interest that the delegates appeared to take in the telephone fire alarm system, the company's career should be crowned with more than ordinary success. Its apparatus has the appearance of being well designed, electrically and mechanically, while its function is unquestioned by anyone. The novel advertising feature of this company was in a "jumping sign" suspended over the door of its exhibit room. Nearly every delegate availed himself of a well advertised feature of quenching his thrist at this exhibit, for here Waukesha water was "on tap" at all times.

The Denio General Electric Company is welcomed to the field of Independent telephony and its presence at succeeding conventions will be a feature of much interest, without doubt. The company was well represented by Garrison Babcock of Rochester, New York, who is the consulting engineer, and John A. Nolan of the same city had a pleasant word and explanation for everyone who inspected the exhibit.

AUTOMATIC CLOSES IMPORTANT CONTRACTS.

The Automatic Electric Company of Chicago has recently closed three contracts of considerable interest to telephone men. The largest is for a 15,000-line automatic telephone system for Havana, Cuba. This is to displace the old "Red Telefonica System," of Havana, formerly owned by a Spanish company, but now a part of the properties of the Cuban Telephone and Telegraph Company. The latter company at the same time contracted with the Automatic Electric Company for a 600-line automatic system for the town of Marianao, Cuba, a suburb of Havana. The initial installation at Havana will be 5,000 lines.

The Cuban Telephone & Telegraph Company will soon erect a new building and lay a conduit and cable system for the new plant, and within a year Havana will have a more perfect and modern telephone system than many American cities possess. The officials of the Cuban Telephone & Telegraph Company, who came to Chicago late in June to close the contract, were President Roland R. Conklin, Vice-President S. L. Jarvis and General Manager W. M. Talbott.

The cosmopolitan character of Havana's population makes the automatic the only logical system to use there, it is claimed, for it would be necessary for human telephone operators to be linguists in a city of so many nationalities.

The other two contracts recently granted the Automatic Electric Company were for a 250-line exchange at Miamisburg, Ohio, for the Montgomery County Telephone Company, and a 1,200-line exchange for the Dakota Central Telephone Company at Aberdeen, South Dakota. These latter two exchanges will be the first to have the new automatic four-party lines with selective ringing and lockout, recently worked out by the Automatic Electric Company's engineers. This new development of the automatic system attracted much attention at the recent Independent telephone convention in Chicago, where it was exhibited for the first time. Only a portion of the Miamisburg and Aberdeen plants will be for party line service.

BAIRD SECRET-SERVICE TELEPHONE

The Baird Manufacturing Company, Chicago, claims to have in the line of a telephone rental rate-raiser just what telephone companies operating party-lines need. The Baird Secret-Service Telephone System is claimed by the manufacturers to be the only successful lock-out and selective ringing telephone system ever devised. All lines and all telephones are under absolute control of the central office operator at all times. Its positive action, and simple, durable construction reduce maintenance cost to a minimum. Some companies that have this system installed have informed the Baird company that it decreases maintenance cost, in that it overcomes the drain on the batteries and wear and tear on the telephones due to "listening in."

This system furnishes such satisfactory service, it is said, that it is an easy matter to raise rental rates to the perfect satisfaction of subscribers. This system is gaining such favor, the company declares, that before long a telephone exchange without Baird's secret-service system will be like a business house without a telephone. Parties can conduct the most private conversations with this system without fear of any "listening in." It has been in operation in many telephone exchanges throughout the United States for periods of from one to five years and is a demonstrated success.

An evidence of the Baird company's faith in its system is that it is willing to send from five to twenty telephones on sixty days' trial to any company operating party lines. It can do this because it realizes that this system satisfies, and it is only necessary to see the system in operation, to appreciate its efficiency and simplicity. Write for any information desired. The company wants everyone to know all about its system.

Baird pay-stations—those simple, durable and efficient money-making telephone-habit cultivators—are keeping the factory busy. With additional factory space and working force, the Baird company can promptly fill all orders. This device has done much to develop the liberal use of the telephone, and has been the means of considerable revenue to telephone companies. Send for illustrated, descriptive catalogue and price-list of pay-stations, or booklet describing Baird Secret-Service Telephone System, to Baird Manufacturing Company, 3 Michigan street, Chicago, Illinois.

MONARCH SWITCHBOARD SALES.

Since the completion of the new Monarch switchboard catalogue the increase in switchboard orders has been very noticeable. The Monarch Telephone Manufacturing Company, of Chicago, reports that instead of a decrease in this part of the business since the spring months an increase

has been experienced. During the last few days boards have been ordered by the following companies:

Vilas Telephone Company, Vilas, South Dakota, 100 lines; David O. States, Buffalo, Kansas, 200 lines; Roland Mutual Telephone Company, Roland, Iowa, 200 lines; Orange Telephone Company, Orleans, Indiana, 100 lines; Wareham Dewey Telephone Company, Ft. Riley, Kansas, 200 lines; Northwestern Telephone Company, Warren, Iowa, 100 lines; City Mutual Telephone Company, Humboldt, Nebraska, 450 lines.

Although only a small portion of the orders received during the past thirty days, the foregoing shows the success attained by the Monarch switchboard. A two-position toll board and a chief operator's desk is being built for the Winchester Telephone Company of Winchester, Indiana. The toll board is equipped for twenty lines and two operators' positions. The chief operator's desk is a model in every way. It embodies all of the latest improvements and several new ideas have been brought out.

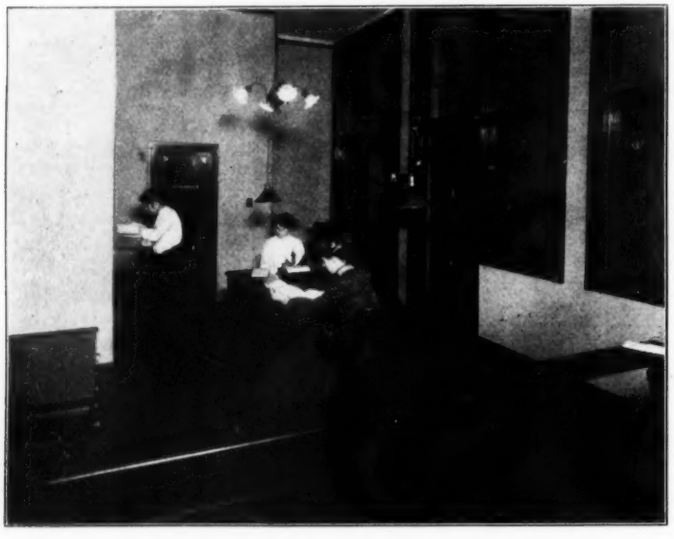
FARNSWORTH, BILLS AND COMPANY.

Farnsworth, Bills & Company is the name of a firm recently established in Chicago for the purpose of handling high-grade telephone stocks and bonds, Don Farnsworth and F. L. Bills, widely known in telephone and financial circles, being the active members of the firm.

DON FARNSWORTH.

Mr. Farnsworth, formerly of New York, enjoys an enviable reputation earned by square dealing in selling investments and organizing several industrial companies throughout the east as well as the west. Mr. Bills hardly needs an introduction to people acquainted with the progress of Independent telephone companies, having organized and financed twenty successful exchanges in the middle west during the past six years.

In its announcement the firm of Farnsworth, Bills & Company very properly suggest that, without doubt, at the present time the securities of modernly constructed, co-operating telephone exchanges, not over-capitalized and operating with liberal rates for service, offer the investor the best returns with the least risk of any of the public utilities.



VIEW IN GENERAL OFFICE.

The bonds of railroads, gas, electric light, water and street railway plants have all in turn passed through a period in which the stability of the securities of each were questioned by conservative investors. The bonds of Independent telephone companies, built with the latest up-to-date equipment and service, have passed this period and the securities should now meet with a ready demand from conservative people.

FRANK L. BILLS IN HIS PRIVATE OFFICE.

DEMAND FOR CENTURY APPARATUS.

The Century Telephone Construction Company of Buffalo, New York, reports an exceedingly busy season, and has been obliged to double its force to keep up with the demand for Century apparatus. It has recently received orders for additional common battery switchboard equipment for the LeRoy Telephone Company, LeRoy, N. Y.; Holley Telephone Company, Holley, N. Y.; Wellsville Telephone Company, Wellsville, N. Y. Also new switchboards for the following: Canisteo Telephone Company, Canisteo, N. Y.; Hamburg Telephone Company, Hamburg, N. Y.; Blasdell Telephone Company, Blasdell, N. Y.; Conewango Valley Telephone Company, South Dayton, N. Y.

The company also has contracted to furnish a complete central office, common battery equipment, including visual signal switchboard, complete power equipment, all telephones and construction material, for the Weedsport Telephone Company of Weedsport, N. Y.; all construction material and telephones for the East Concord Telephone Company, of East Concord, N. Y.; a number of P. B. X. switchboards for the Frontier Telephone Company of Buffalo, N. Y., and a toll switchboard for the Princeton Telephone Company of Princeton, Indiana.

The company also reports an increasing demand for its telephones equipped with platinum electrode transmitters. This transmitter has proven itself to be entirely satisfactory for all purposes, the company declares.

NORTH'S RECENT SWITCHBOARD SALES.

The following switchboards have recently been shipped by the North Electric Company of Cleveland, Ohio: Oswego, N. Y., 400-line increase; Yellville, Ark; Alvord, Texas, branch of Central Exchange; Sandusky, O.; New London, O.; Norwalk, O.; Ada Telephone Company, Dunkirk, O.; Unity Township Telephone Company, East Pales-

tine, O.; Freeport, O.; Brevard County Telephone Company, Cocoa, Fla.; Tuttle, Ind.; Chico, Texas; Bishopville, O.; Delaware, O.; Muncie, Ind.; Deposit, N. Y.; Richwood, O.; Bartram, Texas; Dayton, O.; Riley, Ind.; Kenton, O.; Sulphur Springs, Texas; Windsor, O.; St. Mary's, O.; Mansfield, Mo.; Sayse, O.; Marion, O.; Athens, O.; Yukon, Okla.; West Richfield, O.; Somerfield, Pa.; Cortland, O.; Natchez, Miss.; Leslie, Mich.; Boston, O.; Danville, O.; Mt. Vernon, O.; College Corners, O.; Leipsic, O.; New Concord, O.; Manor, Pa.; Glassport, Pa.; Portage, O.; Pittsburg, Pa.; Central Branch Exchange, New Knoxville, O.; Springfield, O., and Clarence Center, N. Y.

NEW YORK GROUND CLAMP.

The Yonkers Specialty Company of Yonkers, New York, reports phenomenal sales on this device and attributes this fact to the reliability and efficiency of this clamp. It has been adopted as standard construction by most of the Bell telephone companies and many of the larger Independent companies. It is something that even the small companies can use with economy and advantage. The old-fashioned way of making a few turns of the wire around a water pipe and calling it a good ground connection is being rapidly abandoned. A soldered connection, although efficient, requires that the water be drawn from the pipes before it can be made, and is used but very little on that account. The New York clamp makes as good a contact as a soldered connection and can be applied almost instantly.

The band is of pure copper, thoroughly tinned, and for this reason it is most durable and makes a splendid electrical connection. There is but one screw necessary to tighten the band, and this is prevented from doing injury to the pipes by the copper band itself.

These clamps are not only being used for telephone wires, but for automobile ground wire connections, electrical sign connections, and all sorts of electrical purposes where it is necessary to make a connection of a wire to a pipe or rod.

NATIONAL INDEPENDENT TELEPHONE EMBLEM

Too much stress cannot be placed upon the importance of the free use of the new National shield emblem, not only for street and booth signs, but on office stationery, envelopes, toll bills, rental bills, and all other forms and notices which pass into the hands of the general public. W. F. Laubach's admirable article on "Standard Toll Signs," read at the June National telephone convention, struck the keynote as to its great value for continuous, persistent use.

The Edwards-Hine Company of Grand Rapids, Michigan (whose "ad." appears elsewhere in this issue), is making a specialty of furnishing electrotypes of the emblem, in all sizes, for black and color work, singly or in quantities, and has issued a sample circular with price list. Its designers are also getting out a special line of lithograph process and printed office stationery, envelopes, cards, stock certificates, bank checks, etc., for Independent telephone companies, both large and small. A line of samples will soon be ready for mailing, upon special request, stating quantities desired.

The company's telephone systematizing department for office accounting and filing systems is already meeting with great favor among those companies which desire to equip their accounting department in an up-to-date manner. It is also prepared to manufacture any special records or forms upon short notice. A very complete exhibit of the company's line of work was shown at the National convention.

Newly incorporated companies especially will find the Edwards-Hine Company's services very valuable in installing a complete office accounting system at the very beginning of their business, thereby saving many of the losses and complications experienced by numerous companies now in the field.

MODERN TELEPHONE EXCHANGE FOR MERIDIAN, MISSISSIPPI.

Heretofore the south has not experienced the same rapid development of the Independent field as throughout the northern states, but this condition bids fair to become a thing of the past, as many of the more promising cities and towns have either recently been equipped, or new exchanges will be built in the very near future. As an evidence of this fact, the newly organized Home Telephone Company of Meridian, Mississippi, and the associated interests represented by Messrs. Jones & Winters, electrical contractors, of Chicago, are now installing an up-to-date plant in Meridian, and it is their intention to cover all of the promising undeveloped territory in Mississippi and adjoining states by a network of toll lines and by installing modern exchange systems in the large cities and towns. The Meridian plant will be an underground conduit system, using poles for distribution in the residence portion of the city.

The contract for the complete equipment has been placed with the International Telephone Manufacturing Company of Chicago. It will consist of a full multiple, lamp-line signal, double-lamp supervisory, central energy apparatus, with the new "International" four-party indicating selective keys in each cord circuit. The board will be arranged for an ultimate line and multiple capacity of 4,800 lines with an intial equipment of 1,200 lines, together with a complete power plant, consisting of duplicate sets of storage batteries, the necessary charging and ringing machines, marble power board, etc., as well as a complete protective equipment.

The Home Telephone Company will occupy its own home, an especially constructed and commodious fireproof building with modern conveniences for the accommodation of the employes and the business public. The "International" will furnish an especially designed toll board, a chief operator's desk with all necessary equipment, and also the desk for the manager's office, which will be provided with such equipment as will enable him to keep in absolute touch with all departments.

With "International" equipment throughout the entire system and with the latest approved construction, the Meridian plant will be first-class in every detail and will afford an excellent model from which to build other plants in the southern field.

UNIVERSAL BATTERY GAUGE.

The Manhattan Electrical Supply Company of New York and Chicago is now supplying the trade with its Universal Battery Gauge, the product of years spent in investigating and testing the merits of other makes of gauges, as well as upon inventions of its own. This battery gauge is of convenient size to carry in the pocket; it is made up in two styles—one for testing a single cell and the other for testing from two to five cells in series, and is sold at a popular price.

Every set of batteries will sooner or later contain one or more dead ones, and for that reason an instrument of this character becomes an indispensable article to every man whose work brings him in contact with line or batteries, and to every user of a battery. These gauges are fully guaranteed and no charge is made for repairs for one year.

Catalogue No. 21, a volume of over 700 pages, containing everything in the electrical line, will be ready for dis-

tribution about August 1, and will be furnished upon application.

From both an economical and serviceable standpoint low amperage batteries are the thing for telephone work. Conclusive proof of this exists in the heavy and growing demand for the Mesco Dry Battery, which the Manhattan company makes especially for telephone and other intermittent work. Results of numerous comparative tests between Mesco and high amperage batteries, the manufacturers state, show that where Mesco is used, the life of both battery and transmitter is greatly prolonged. While it has taken some time for telephone companies and other battery users to reach the "Mesco conclusion," the call for this battery would seem to indicate that high amperage batteries for telephones are being rapidly displaced.

THE SANDWICH POLE CHANGER.

The Sandwich Pole Changer is manufactured by the Sandwich Pole Changer Company of Sandwich, Illinois. It is claimed for it that it is extremely simple, rigid and compact in construction. Its mechanism is mounted on an oak base and covered by a neat oak-hinged box with beveled plate glass front and complete instrument, measures only 9x6x5 inches and weighs but four pounds. It is so constructed that it will work either in a horizontal or vertical position, this admitting of it being mounted on cabinet or hung on the wall, and as it is practically noiseless, is not objectionable in the operating room.

The machine has but three contact springs, which are made of helmet bronze, and have contact points of very heavy platinum. The contact springs engage alternately from their opposite sides and consequently can not be forced out of their normal position by extended use. As the whole mechanism is securely mounted and locked in one solid, heavy brass frame, it is quite impossible for any parts to get out of adjustment, and therefore, never requires adjusting after leaving the factory.

No primary cells is used as the vibrator is fed directly from the main battery through resistance coils and the consumption of current is hardly one milliampere, which is practically unnoticeable. This eliminates renewal expense of the separate battery and also does away with the trouble from frozen elements of the same, where it is necessary for the ringer to be kept in a cold room in frigid weather.

The Sandwich Pole Changer is made in four different styles. The manufacturers guarantee this generator to do good work and will ship the same on thirty days trial, to be returned at the company's expense if not satisfactory in all respects.

THIRTEEN LUCKY FOR COOK.

Frank B. Cook recently made an application for patent on a self-soldering heat coil on the 13th of one month, it was allowed on the 13th of another month, and issued on the 13th of June.

Three new men have been added to Frank B. Cook's sales department, and will push Cook's self-soldering protectors, pole cable terminals and construction material in various parts of the country. M. A. Gurney is covering Michigan, Indiana and Ohio; C. C. Newburn will travel in Minnesota and the Dakotas, and F. A. Rader in Kansas, Nebraska and the Territory. New York, and Pennsylvania are being covered for Cook by John Strasburg, Wisconsin and Illinois by G. C. Fricke, and Iowa and Missouri by F. R. Parker.

Cook ought to be well represented by these "knights of the grip," and his already growing business will no doubt receive an added impetus.

PICNIC OF INDIANAPOLIS "HELLO GIRLS."

About 250 telephone girls, employes of the Indianapolis Telephone and New Long-Distance Telephone companies of that city, enjoyed an outing at Broad Ripple Park on the afternoon and night of July 19. About half of the number, the night operators, were at the park in the afternoon, and relieved the older girls in the company's employ at night. H. C. Goldrick took care of the girls after leaving the company's offices and did much to make the event a success. All of the girls entered into the spirit of the thing from the time they landed at Broad Ripple, and it was a sad awakening when they had to return to their work. The service of the companies was not in the least impaired, the affair being so arranged that the regular force of girls was always at work on the boards.

H. B. Sale, vice-president and general manager of the company, "chaperoned" the party, and other heads of the local and long-distance departments were in evidence. Though the girls made up the bulk of the outing crowd, the picnic was a treat to the whole company, and all took part. Every attraction on the grounds was thrown open to the "hello" girls. Coupon tickets admitting the bearer were distributed. Dinner and supper were served on the grounds. This was followed by a ride on the steamer "Sunshine," and then the throng of girls made a rush for the band stand, where their pictures were taken.

The Broad Ripple cars chartered for the occasion were lavishly decorated with banners and flags, and this, added to the cheering and singing of the released operators carried the news to the Indianapolis public along the line that the "girls of the I. T. Co." were out for a picnic. No accidents marred the outing, and from every standpoint the picnic was voted a huge success.

ARMY POST TELEPHONE SYSTEM TO BE ENLARGED.

In accordance with the instructions recently issued from the war department, each post in the United States army is to be equipped with a complete telephone system, says the Atchison (Kan.) Globe. The offices of the commanding officer, quartermaster, commissary, hospital, guard house and the post exchange as well as organization and the residences of the commanding officer, quartermaster, adjutant, and surgeon will be furnished with connections. The same instructions state that this system will not be connected with a commercial line except by the approval of the secretary of war and under written terms which shall conserve the interests of the United States. Fort Riley's system will consequently be enlarged by the addition of telephones for each troop and battery. The present switchboard has sixty drops, which will prove ample for all connections. The telephones and other supplies necessary for the enlarging of the system have yet to be received.

ASSEMBLING MACHINERY BY TELEPHONE.

Machinery experts can locate many troubles in a machine by the unnatural sound it makes. Recently a Canadian firm had some difficulty with a machine of Boston manufacture which they had tried to install themselves. Finally, in despair they called up the Boston firm over the telephone and were directed to run their telephone wires into the room where the machine was so that an expert, who was at hand, could determine by the noise it made what was the trouble. The expert directed the Canadian people just where the receiver of the telephone should be placed and in a few seconds more he had told them what was the trouble, and how to remedy it. The change occupied but a few moments and in a short time everything was running smoothly.

Trade Notes

A NEW manufacturing plant will be established at Gallatin, Tennessee, in the near future by J. T. Durham and W. W. Pardue, for the manufacture of oak, locust and mulberry telephone, telegraph and electric light insulator pins and brackets.

THE AUTOMATIC TELEPHONE MANUFACTURING COMPANY has been incorporated at Augusta, Maine, to manufacture telephones. The capital stock is $200,000, and the officers are: President, L. J. Coleman, Gardiner, Me.; treasurer, W. S. Lee, of Augusta, Me.

TWO MORE illustrated folders are being distributed by the Dean Electric Company, Elyria, Ohio, and will be sent upon application. They are Nos. 6 and 7, the former descriptive of the Dean Express Type switchboards and the latter telling of No. 1 type common battery switchboards.

THE F. BISSELL COMPANY, Toledo, Ohio, is distributing a circular, calling attention to the applicability of the Burns adjustable telephone. In addition to a special form of telephone instrument, the adjustable holding rack is made so as to accommodate any form of standard desk telephone.

"GET OUT OF THE RUT" is the title of a neat little illustrated booklet issued by the Calculagraph Company, New York city, dilating upon the merits of the calculagraph, explaining uses of the machine and showing method of operation. Every telephone manager should have one of these booklets.

ROTH BROTHERS, Chicago, manufacturers of motors, are reaching out after foreign trade, and through the medium of the Sun Trade Journal, published at Tokyo, Japan, they are making a bid for a share of the business of the "Yankees of the East"—those in particular needing motors. Their "ad" is a mixture of Japanese and English, and should "do the business."

AT THE RECENT Telephone Convention in Chicago one of the most tasteful and popular souvenirs was the frog scarf-pin, representing the trade mark of the Bissell Company of Toledo, Ohio. As not everyone was present at the convention the company wishes to send pins to those who have not received them and will mail them, upon request, without charge. The pins are worth writing for. This is certainly a novel and effective method of advertising a house already well known.

L. W. TYLER, wire chief of the new Sioux City (Iowa) Telephone Company, is the proud possessor of a No. 2 Fisher testing set, which he will use for the determination of the location of grounds, crosses and open wires, and all manner of defects. Mr. Tyler has diagnosed some complicated cases of cable trouble and managed to save a considerable sum for former employers by his facility for calculating, from measurements, the location and character of such faults.

THE GRAY TELEPHONE PAY-STATION COMPANY, Hartford, Connecticut, recently has issued for the benefit of the trade a very neat and attractive illustrated bulletin containing specifications covering equipment of toll stations, with automatic collections, together with such data as will be found useful in selecting and ordering same. This information is confined strictly to the Gray cabinet pay-stations. The gravity principle of the Gray automatics is also fully described. This bulletin will be sent free to any telephone man making application.

THE MOON MANUFACTURING COMPANY, Chicago, calls attention to the illustration in its advertisement in this issue, which shows very clearly their method of dividing cable and tapping out cable wires, in single or in multiple distribution, without sleeve splices or wipe joints. The company claims not only economy in the cost of installing cable, using this apparatus, but economy in maintaining clear circuits in cable lines, having all wire splices accessible, when necessary to reach them. The cable joint is permanent, however, and the cable ends remain sealed.

BEARING the title, "Telephone and Annunciator Practice," the Electric Gas Lighting Company, Boston, has issued a handsome catalogue, the sub-title being "A Few Examples of Representative Installations. Instructive. Explanative." The first section of the catalogue is devoted to annunciators, followed by about an equal portion to "annunciphones," combining the annunciator and telephone systems. The remainder is given up to illustrations and descriptions of telephone apparatus and switchboards, and of recent large installations made by the company.

THE BELDEN MANUFACTURING COMPANY, Chicago, reports a steadily increasing business on its magnet winding machines and automatic counters from operating companies that are making their own repairs, as well as from telephone manufacturers. The counting machine is mounted on an adjustable base, so that it can be connected to any magnet winder. It is connected to the winding machine by a flexible shaft, and automatically records the number of turns of wire wound on coils. We understand that the Belden company makes the only machine for this purpose on the market.

THE UNITED TELEPHONE AND SWITCHBOARD COMPANY, Orrville, Ohio, successor to the Gemmill Telephone and Manufacturing Company, recently damaged by fire, has moved into its commodious modern factory. This company manufactures a full line of high grade telephones, fully guaranteed for five years. Included in its apparatus is a new type desk stand having the switch mechanism, induction coil and cord terminals mounted in the base, making a substantial instrument and one that can be easily examined. Printed matter, prices and sample telephones will be sent upon request.

THE ADIRONDACK TELEPHONE COMPANY, Malone, New York, has just placed an order with the Dean Electric Company of Elyria, Ohio, for a complete common battery multiple switchboard of 1,200 lines ultimate capacity, to be fitted with the new Dean four-party selective ringing equipment, including individual indicating ringing keys in each cord circuit. The present installation will consist of two three-position switchboard sections and a complete power plant. It is interesting to note in this connection that all of the Dean contracts for central battery switchboards have included complete four-party line equipments.

ONE OF THE greatest hits of the recent National Convention, and one of the things that brought forth favorable comment from the hundreds in attendance, was the souvenir distributed by the Swedish-American Telephone Company. It consisted of a watch fob designed to represent the well known trade-mark of this company. It is made of gold in an irregular shape, with the trade-mark brought out in colors, and all mounted on a black silk ribbon. The demand for these souvenirs far exceeded the supply, several hundred of them being given out. The fact that this well known concern furnished such a valuable and appropriate souvenir deserves special mention.

IN THE RURAL LINE DISTRICTS

Popcorn's telephone line is about ready for use.—*Popcorn Poppings in Portland (Ore.) Telegram.*

The farmers' telephone line is still on the boom.—*Mt. Harmony Musings in Unionville (Mo.) Journal.*

The neighbor's telephone is being improved very much.—*Nelson Notations in Concordia (Kan.) Kansan.*

The telephone agent has four men helping him grub.—*West Dorling Doings in Little Falls (Minn.) Herald.*

Lightning yesterday morning "played thunder" with a number of telephones on both the city and Farmers' line.—*Winchester (Ill.) Times.*

We don't hear so much talk about the telephone line as we did. What is the matter, Mr. Promoter?—*Newman Nubbins in Raymond (Miss.) Gazette.*

The work on the telephone line is progressing rapidly, only a few days now, girls, until you can ring up your best fellow.—*Gratiot (Wis.) Reporter.*

Thomas Bennett has had a telephone put in his house. Now the entire Muddy is supplied with telephones.—*On the Muddy Mites in Auburn (Neb.) Herald.*

Milt Hankins spent a season at Girard and secured a lady of means for a wife, now coming back to help Mr. Burke operate his telephone.—*Carlinville (Ill.) Argus.*

With the telephone ringing in our houses and a railroad in sight, Grantboro can raise up her head and see the outside world.—*Grantboro Gossip in Newcastle (Pa.) News.*

The new telephone line from Behler to Arnettsville has ceased carrying wireless messages and now transports common vocalgrams.—*Hagan's Hash in Fairmont (W. Va.) Press.*

J. N. Stubbs hauled a load of telephone poles to his residence Monday. He says he wants to "rubber" like all the other patrons.—*Memphis Murmurs in Aurora (Neb.) Republican.*

Lemuel K. Cushing, secretary of the Illinois Electric Company of Chicago, recently paid a visit to French Lick Springs, and while here killed a ten-foot rattlesnake, which had so many rattles he could not count them. The snake must have been 1,000 years old, and the strange thing about its death was that "Lem" killed the viper with one look. He and the snake met—there was a rattle

and a hiss—"Lem" fixed his piercing optics on those of the deadly serpent—Mr. Rattler wavered, gasped, gave a convulsive quiver and was dead. What there was in "Lem's" gaze that was poisoner than the snake's no one knows. The like of it was never heard of before around here. Mr. Cushing took the skin home with him to exhibit to his friends at Moraine Hall, Highland Park, he said.—*French Lick Springs (Ind.) Reporter.*

Hotels do not make a practice of serving pearls worth $200 with oysters they give their patrons. This distinction belongs to the Auditorium. A. L. Tetu of Nashville, Tennessee, secretary of the National-Interstate Telephone Association, sat down before a choice half-dozen oysters of the little neck variety last night. He picked up one, when an iridescent gleam dazzled him. He wiped his glasses and examined the shining thing. "This is all right," he said to himself, as he dug a pearl the size of a pea out of the oyster. He dissected the other oysters and ordered another dozen, but the pearl supply was exhausted. He took the pearl to a jeweler,

who pronounced the gem to be of the first water and worth $200. Mr. Tetu left for home on a late train with his prize.—*Chicago (Ill.) Examiner.*

Telephone poles have been put up near this place, and if you hear us halloa "hello" over there don't be scared.—*Hossan Handouts in Ada (Ohio) Record.*

Some officers of the telephone company are sitting up nights watching certain lines. Complaints were made of last Friday evening and another evening, too.—*Pohocco Pickings in Fremont (Neb.) Tribune.*

Thursday Mr. D. S. Bayless was around investigating in regard to the telephone business. Suppose almost all will want one. Think they would be very nice to have.—*Cedar Hill Items in Winfield (Kan.) Courier.*

Holder isn't in it. Brokaw has a telephone system, for which Dell Robinson is operator. He is also mayor of the city, sheriff, police, president of the bank, cashier and bookkeeper.—*Brokaw Brevities in Bloomington (Ill.) Pantograph.*

The "hello" girls of the Cumberland Telephone Company went on a strike last week. They complained of the treatment received from the manager. On going out they got him in a corner and told him a "few" things.—*Grayville Grist in Carmi (Ill.) Democrat.*

The Southeast Missouri Telephone Company finished putting in their system here—about sixteen 'phones—Wednesday. "Central" is located at Walker's store and the ever-accommodating "Jimmy" will act in the capacity of "hello girl." Tell your troubles to him.—*Benton (Mo.) Record.*

Fred Hoffman and Morton Davis thought they would have a telephone line of their own, so they sent after a couple of 'phones and put in their line and everything worked alright except that they couldn't ring each other up or hear each other talk. So the boys have 'phones to sell that you can get at a discount.—*Holstein Happenings in Hastings (Neb.) Tribune.*

Incorporations of the Month

ALABAMA.

MARION JUNCTION—The Marion Junction Telephone Company. Incorporators: S. A. Brice, and others.

CANADA.

ARTHUR, ONT.—The North Wellington Telephone Company. Capital stock, $15,000. Directors, M. Heffernan, D. Brocklebank, J. Goetz, G. Dodge, H. J. Colwill, J. M. Roach, J. H. Thomas.

CALIFORNIA.

SANTA ROSA—The Upper Dry Creek Telephone Company. Capital stock $12,000.

ILLINOIS.

POLO—The Polo Mutual Telephone Company. Capital stock $5,000. Incorporators, John Eckerd, C. W. Hays, C. C. Price.

MILLEDGEVILLE—The Milledgeville Mutual Telephone Company. Capital stock, $10,000. Incorporators, T. H. Fleming, A. B. Puterbaugh, A. M. Fike.

BLOOMINGTON—The Kinloch-Bloomington Telephone Company. Capital stock $500,000. Incorporators, R. E. Williams; H. F. Farwell and Sig Livingstone.

ATHENS—Articles of incorporation have been issued by the secretary of state for the Menard County Telephone Company. Capital stock, $5,000. Incorporators, Lee Kincaid, W. C. Scott, T. W. Kenyon.

ALBION—The Edwards County Mutual Telephone Company has reorganized and incorporated with a capital stock of $4,000. The following officers have been elected: President, Charles Clark; secretary, O. A. Bunting; treasurer, Moses Gumbrell; directors, E. S. Davis, J. M. Gallagher, N. W. Byrnes, Bert McTaggart, Moses Gumbrell, Charles Clark, O. A. Bunting, Philip King, G. A. McDonald.

INDIANA.

VALPARAISO—The Crescent Electrical & Manufacturing Company. Capital stock, $20,000. Directors, James H. McGill, Harry W. Harrold, Leslie R. Skinner.

ROSEDALE—The Rosedale & Fontanet Farmers' Telephone Company of Parke and Vigo counties. Capital stock, $3,000. Directors, Thomas M. Patterson, William Stuthard, Henry Stuthard, George Rukes, Charles Mulvahill.

LYNN—At the annual meeting of the stockholders of the Lynn Telephone Company the following officers were elected: President, S. C. Bowen; secretary, J. S. Blair; treasurer, Daniel Hecker; directors, W. R. Halliday, M. M. Lacey, G. A. Dwiggins, J. B. Chenoweth, Daniel Hecker, S. G. Bowen, J. S. Blair.

IOWA.

DECORAH—The North Calmar Telephone Company. Capital stock $3,040.

HAVELOCK—The Havelock Mutual Telephone Company. Capital stock $28,000.

MAQUOKETA—The Home Telephone Company. Capital stock $75,000. Incorporators, S. E. Tilton and others.

MALVERN—The Mills County Telephone Company. Capital stock, $50,000. Incorporators, M. W. Sells and others.

EARLING—The Earling Telephone & Telegraph Company. Capital stock $10,000. Incorporators, P. J. Korth and others.

MUSCATINE—The Massena Independent Telephone Company. Capital stock, $10,000. Incorporators, George Austey and others.

DES MOINES—Articles of incorporation have been filed with the secretary of state for the Eitzen & New Albin Telephone Company. Capital stock, $3,500.

GRANITE—The Granite Telephone Company. Capital stock $1,600. Incorporators, J. M. Lynch, Wm. Grotewold, D. F. Billings, Len Moeller, Robert Wills.

NEW SHARON—Articles of incorporation have been filed by the New Sharon Electric Company. Capital stock, $75,000. The officers of the company are as follows: President, W. A. Bryan; secretary and treasurer, W. E. Bryan.

OTO—The Farmers' Mutual Telephone Company. Capital stock $10,000. The officers of the company are as follows: President, John Hilfiker; vice-president, C. C. Allman; secretary, H. P. Simmons; treasurer, L. L. Pearce; directors, the above officers and Chris Eckert, Charles Sprengler, Robert Tudehope.

KANSAS.

RIVERDALE—The Riverdale Telephone Company.

OSBORNE—The Bloomington Mutual Telephone Company. Capital stock, $3,000.

WAVERLY—The Coffee County Telephone Company has been organized at this place with a capital stock of $10,000. President and general manager, H. A. White; vice-president, C. H. McDuffie; secretary and treasurer, O. J. Rose.

KENTUCKY.

WINGO—The Wingo Telephone Company. Capital stock, $1,500.

LYNNGROVE—The Lynngrove Telephone Company. Capital stock $2,000.

PUDUCAH—The Paducah Home Telephone Company. Capital stock $25,000.

SULLIVAN—The Sullivan Telephone Company has been incorporated to operate a telephone system.

MAINE.

SMYRNA MILLS—The Independent Telephone Company. Capital stock $10,000. Incorporators, J. H. White, Ashland; A. P. Daggett, S. O. Stevens and others of Smyrna Mills.

AUGUSTA—The Automatic Telephone Manufacturing Company. Capital stock, $200,000. President, L. J. Coleman, Gardiner; treasurer, W. S. Lee; Clerk, C. L. Andrews, both of Augusta.

PALERMO—A stock company has been organized in this place, to be known as the Palermo Telephone Company. The following officers have been elected: President, S. E. Bowler; secretary, W. S. Jones; treasurer, W. W. Turner; directors, J. R. B. Dinsmore, M. J. Nelson, W. A. Nelson, S. E. Bowler, W. S. Jones, J. W. Worthing, W. W. Turner.

MISSISSIPPI.

AMORY—The Mississippi and Alabama Telephone Company. Capital stock, $10,000. Incorporators, J. C. Cheek, J. C. Burliner, and others.

MICHIGAN.

MONROE—The W. C. Sterling & Son Company. President, W. C. Sterling; vice-president, W. P. Sterling; secretary-treasurer, W. C. Sterling, Jr. This company was formerly W. C. Sterling & Son

MINNESOTA.

RICE—The Apollo Telephone Company.

GRANITE FALLS—The Granite Falls Telephone Company. Capital stock $10,000. Incorporators, S. O. Tjosvold, K. O. F. Jeidstad, J. J. Mooney.

MINNEAPOLIS—Members of the Backus-Brooks Lumber Company have incorporated the International Telephone Company with a capital stock of $50,000.

GARFIELD—The Farmers' & Merchants' Co-operative Local Telephone Company. Capital stock $10,000. Incorporators, Peter Engstrom, Charles Kloehn, Ida; Gustav Leo, Garfield; O. J. Berg and G. T. Winkjer, Moe.

BROWERVILLE—The business men of Browerville have organized a telephone company and will establish a local exchange at once. The following officers have been elected: President, Harry Lee; vice-president, J. H. Sheets; treasurer, Lambert Irsfild; secretary and manager, W. H. Grey; directors, J. H. Sheets, I. F. Sarff, Harry Lee, H. E. Hart, Thomas Heid, Lambert Irsfild.

MISSOURI.

CARL JUNCTION—The Carl Junction Telephone Company. Capital stock, $10,000, divided into shares of $100 each.

BISMARCK—The Bismarck Telephone Company. Capital stock $3,000. Incorporators, J. L. Eaton, O. W. Ramsey and others.

FRANKLIN—The Farmers' Central Telephone Company. Capital stock $2,500. Incorporators, E. W. Swallow and Simon Bruesch.

PACIFIC—The Pacific Telephone Company. President, Dr. Booth; vice-president, L. R. Dougherty; secretary, John Mauthe; treasurer, August Mauthe.

ORAN—The Scott County Telephone Company. Capital stock $12,000. Incorporators, Frank J. Stein, Arthur V. Scheiber, N. H. Stubblefield, Jr., M. Helmbacker and others.

LAMAR—The Lamar & Barton County Telephone Company. Capital stock $40,000. Incorporators, J. W. Layne, J. B. McGilvray, E. J. Layne, A. E. McGilvray, M. D. Perry.

VANDALIA—The Vandalia Union Switchbaord Company. Capital stock $3,000. Incorporators, James H. Wright, Guy McClure, James K. Moore, Lewis W. Mottey, W. E. Parker and others.

CENTERVILLE—The Centerville Telephone Company. Capital

stock $2,000. Incorporators, J. J. Jamison, W. S. Carter, Z. C. Smith, C. M. Buford, William J. George, William Rayfield and others.

NEBRASKA.

MILLER—Miller Independent Telephone Company.

CLAY CENTER—The Clay Center Telephone Company.

BRIDGEPORT—The Wehn Telephone Company. Capital stock, $25,000. Incorporators, J. W. Wehn, J. H. Wehn and others.

HALLAN—The Old Farmers' Telephone Company. Capital stock, $25,000. President, Ed Lauderbach; secretary, Chris Keller; vice-president, A. L. Axthelm; treasurer, J. Schwaninger.

ALLIANCE—At a recent meeting the Long Lake Telephone Company elected the following officers: President, N. H. Krause; vice-president, Wm. Baur; secretary and treasurer, T. M. Lawler.

OAKLAND—A number of farmers of this vicinity and business men recently held a meeting in this place for the purpose of considering the question of better telephone service. L. L. Young is one of the interested partis.

NEW JERSEY.

TRENTON—The Coast Line Telephone Company. Capital stock, $1,000,000. Incorporators, D. A. Reynolds and E. H. Brock, New York, and E. P. Clark of Jersey City.

NEW YORK.

VOLNEY—The Volney Telephone Company. Capital stock, $500. Incorporators, E. B. Tice, James Vant, J. S. Moss, of Volney, and others.

NAPLES—The Ontario & Steuben Telephone Company. Capital stock, $40,000. Directors, J. E. Lyon, W. H. Housely, F. W. James, Naples.

FULTON—The Patron's Telephone Company. Capital stock $25,000. Directors: G. D. Adams, L. D. Beardsley, O. B. Kellogg, Fulton.

OLIVE BRIDGE—The Olive Bridge Telephone Company. Capital stock $500. Incorporators, Frank Roasa, J. V. Merchow of Olive Bridge and J. S. Hill.

WEEDSPORT—Weedsport Telephone Company. Capital stock, $20,000. Incorporators, Charles S. Caywood, H. E. Durston, George Cummings of Rose Hill.

HANNIBAL—The Wiltseville Telephone Company. Capital stock $480. Incorporators, Otis A. Kipp, J. S. Stevenson, A. W. Wiltse, all of Hannibal, and others.

WESTPORT—The Westport, Essex & Lewis Telephone Company. Capital stock $3,000. Incorporators, Frank E. Smith, Melvin E. Lott, Aiken B. Blenn, all of Westport.

CERES—The Bells Run Telephone Company. Capital stock, $6,000. Incorporators, Fred E. Gleason, John J. Roberts, of Ceres; LeRoy M. Pauphen, Beirun. Pa., and others.

ALBANY—The United Message Company. Capital stock, $10,000. Incorporators, Howard Hendrickson, William A. Hendrickson, Mulford H. Teator, all of Albany, and others.

VARYSBURG—The Tonawanda Valley Telephone Company. Capital stock $2,500. Incorporators: Charles N. Davis, John J. Barnes, George P. Bauer, all of Varysburg, and others.

SYRACUSE—The Independent Telephone Company. Capital stock, $1,000,000. Incorporators, Jacob Amas, Baldwinsville; John J. Cummings and Galis Talheimer, Syracuse; and eight others.

EAGLE LAKE—The Lake Champlain Telephone Company. Capital stock, $250,000. Directors, H. E. Hawley, Albany; F. W. Story, Boston; O. O. Dennis, Whitehall; E. D. Raymond, Fairhaven, Vt.

ROSE HILL—The Rose Hill Telephone Company. Capital stock, $5,000. Directors, C. T. Easton, W. H. Ackles, and F. Harvey of Marietta, W. H. Sanders and G. E. Barler of Spafford, and E. B. R. Nash, all of Weedsport, and others.

BROOKLYN—The Commonwealth Telephone Company. Capital stock, $200,000. Incorporators: Edwin M. Brooks, 123 Schermerhorn St.; Daniel Buhre, Kings Highway, and O. Parker, both of Brooklyn; John A. Crawford, Montclair, N. J.

ALBANY—The Lake Champlain Telephone & Telegraph Company has filed a certificate of incorporation with a capital stock of $250,000. Directors: Henry E. Hawley, Albany; F. W. Story, Boston; O. O. Dennis, Whitehall; E. D. Raymond, Fairhaven, Vt.

OHIO.

HIRAM—The Hiram Telephone Company. Capital stock $10,000. Incorporators, H. C. Hurd, W. Dudley, E. E. Snoddy, H. T. House, G. A. Vincent.

JACKSON—The Citizens' Telephone Company. Capital stock, $4,000. Incorporators, Chester A. Dyer, G. W. Brooks, Joseph Lewis, R. E. Swaney, C. C. McKinniss.

NORTH BALTIMORE—The North Baltimore Telephone Company. Capital stock $35,000. Incorporators: T. P. Sylvan, E. A. Reed, James Niven, W. H. Nutt, J. T. Davies.

ELMIRA—A new telephone company to be known as the Northwestern Mutual Telephone Company has been organized near Elmira with the following officers: President, W. C. Borton; secretary, Elias Wyse; treasurer, J. F. Reeves. The company will begin with fifty telephones in service.

OKLAHOMA.

OLUSTEE—The Fairview Telephone Company.

FORT COBB—The Fort Cobb Telephone Company. Capital stock, $2,500. Incorporators, R. A. Woolridge and Jno. H. Wright of Oklahoma City and E. J. Luce of Ft. Cobb.

FRANKLIN—The Farmers' Central Telephone Company of Cleveland County. Capital stock $3,500. Stockholders: E. W. Swallow, J. L. Hoshall, Simon Breusch, J. W. Asher, J. P. N. Haines.

MEDFORD—The Grant County Rural Telephone Association has elected the following officers: President, O. F. Hendricks; vice-president, E. E. Flora; secretary, S. D. Million; treasurer, S. Long.

CORBETT—The Citizens' Telephone Company. Capital stock, $10,000. Incorporators, E. M. Abernathy of Lexington; J. P. Corbett, Wm. Montan, Lee Baley, P. A. Homes, of Corbett; W. E. Dragor, Buckhead.

OKLAHOMA CITY—The Lone Wolf Telephone Company. Capital stock, $2,500. Stockholders, D. L. Stromquist of Mulhall, R. A. Wooldridge of Oklahoma City and John H. Wright of Oklahoma City.

OKLAHOMA CITY—The Rural Telephone Company. Capital stock $10.000. Incorporators: W. P. Moore, C. H. Randall, H. F. McCoy, W. G. Ingham, Wm. A. Parson, Geo. J. Eacock, A. M. Gustin, all of Oklahoma City.

PENNSYLVANIA.

BENTON—The Benton Rural Telephone Company. Capital stock $5,000.

MESHOPPEN—The Meshoppen & Auburn Telephone Company. Capital stock, $5,000.

BERWINSDALE—The Clearfield & Cambria Telephone Company. Capital stock $5,000.

SLIPPERY ROCK—The Slippery Rock Independent Telephone Company. Capital stock $5,000.

MONONGAHELA—The Monongahela Telephone Company. Capital stock, $30,000. Directors, L. E. Flint, Monongahela; H. L. Lamb and A. F. Moses, California, Pa.

SOUTH CAROLINA.

ST. MATTHEWS—The St. Matthews & Cameron Telephone Company. Capital stock, $1,000. Incorporators, J. E. Wannamaker, J. E. Morse, C. F. Zeigler and associates.

SOUTH DAKOTA.

EDGEMONT—The Edgemont Telephone Company. Capital stock, $5,000. Incorporators, Arthur J. Colgan, John Waldron, and others.

BOOGE—The Rock & Minnehaha Telephone Company. Capital stock $2,500. Incorporators: Thomas Thompson, Ole Julson, Daniel Eihern.

CENTERVILLE—The Centerville Rural Telephone Company. Capital stock $25,000. Incorporators: W. E. Ege, Marvin Carlson, G. A. Anderson, F. A. Shoberg, C. J. Peterson.

TENNESSEE.

NASHVILLE—Articles of incorporation have been filed for the Lick Creek Telephone Company of Benton County. Capital stock $500. Incorporators, I. N. Hill, T. C. Clymer, B. F. Stockdale Thomas Dillon, W. A. Benton.

TEXAS.

TEMPLE—O. W. Jones of Oscar, located seven miles east of this city, has made arrangements for installing an electric light and telephone plant at Rogers, fifteen miles south of Temple. Mr. Rogers and his associates will build a first-class telephone exchange and furnish local service not only to the town of Rogers, but to a large section of fertile farming country extending around it.

VIRGINIA.

LEW—The North Frederick Telephone Company has been incorporated at this place to construct a telephone system.

WASHINGTON.

OLYMPIA—The Spring Creek Farmers' Telephone Company of Klickitat county. Capital stock, $300. Incorporators, C. F. Kayser, J. E. Adams, and J. Hornibrook.

BELLINGHAM—Articles of incorporation for the Farmers' Mutual Telephone Company have been filed with the county auditor. Capital stock, $45,000, which amount is divided into 3,000 shares of the par value of $15. Trustees, P. D. Harkness of Everson, L. Bailey of Nooksack, G. W. Herndon of Custer, August Nyman of Custer, A. W. Frost of Lynden, Edward Brown of Custer, L. G. Van Valkenberg of Sumas.